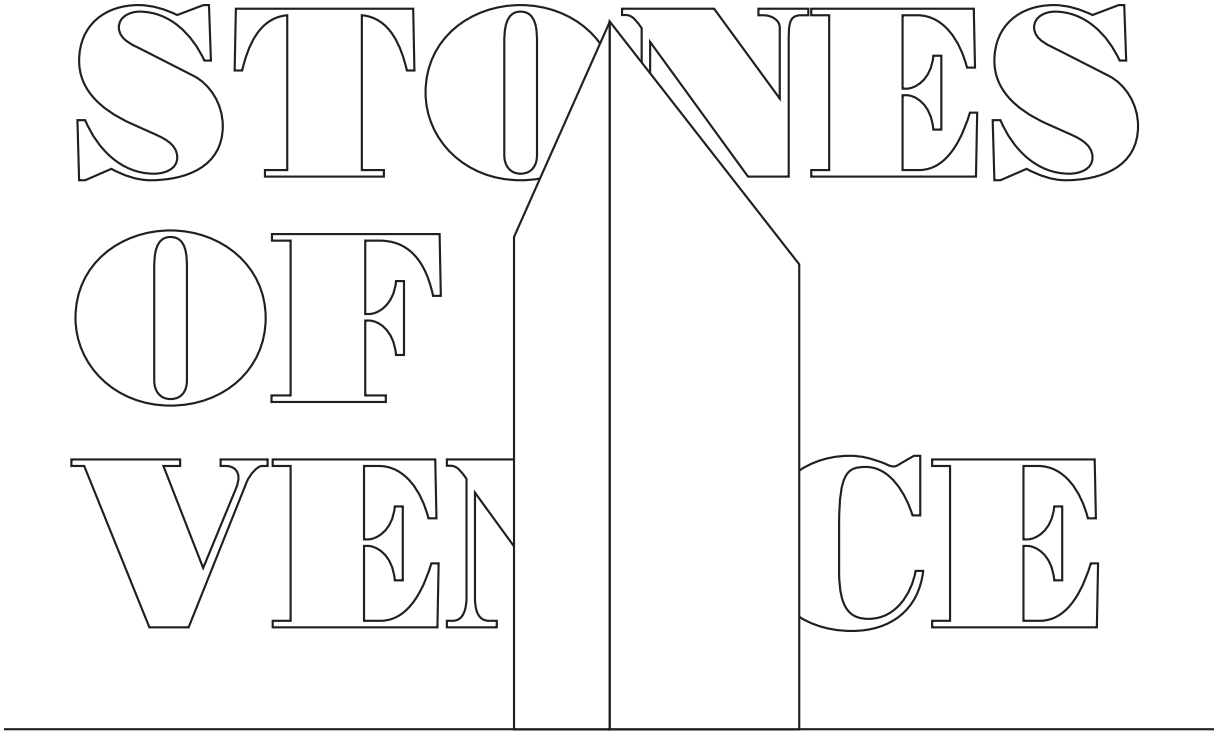
THE TALL STONES OF VENICE



THE TALL STONES OF VENICE

A skyscraper on Venice Lagoon

International Student Workshop
11-29 / 07 / 2011
Iuav University of Venice / Italy

Edited by
Luigi Croce
Dario Trabucco

Art Direction and Layout
Emanuele Paladin
Giorgio Braga
Cover
Michel Carlana

With the support of
Studio Altieri
Permasteelisa
Schindler group
AGC Gass

FOREWORD

Luigi Croce

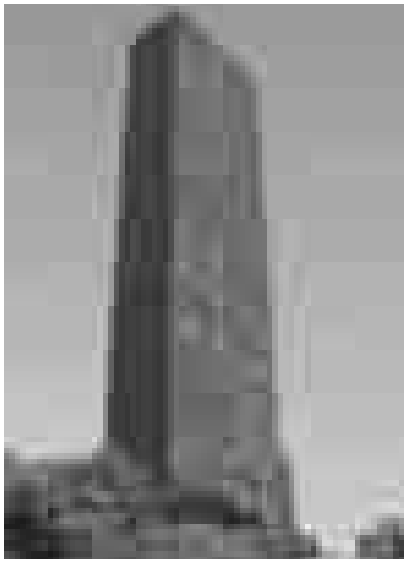
This little book encases the collective work produced by teachers and students participating to the international workshop in architectural design "The Tall Stones of Venice", held at IUAV University of Venice from the 11th to the 29th of July 2011.This workshop is intended as the first step on a hopefully long path that the "Venice Architectural Association (VAA) intends to beat. One year ago, during a casual conversation with my young friend and colleague Dario Trabucco about the pros and cons of the various schools of architecture that we know, we were suddenly (and, I must say, almost naively) struck by the realization of how important it was for our school, University IUAV (where we both studied and now teach) to be set in such an incredibly stimulating city like Venice.
I remember when I was a student how intellectually refreshing it was to walk out of a classroom, maybe after a boring lecture (there were many) and see a boat almost emerging from a thick fog, invisible till the last moment but announced by the gentle noise of its oars. How magical, almost incredible and surreal it was to wander around and get lost in this labyrinthian city, in a passionate quest for the urban and architectural rules governing the maze of channels and lanes...

So we immediately thought: these experiences are unique regardless one is a painter, a writer, an architect studying the past, or, like in our workshop, designing a skyscraper.
This is why Dario and I chose Venice for our future cultural activity and founded the VAA or Venice Architectural Association.
The pages that follows illustrate the results of our first workshop, which we named "The Tall Stones of Venice" to make it evident, through the reference to Ruskin's masterpiece, that in this city, manmade and natural, past and future can blend just as water and stone so magically do.

SUSTAINABLE TALL BUILDINGS. MARKETING STRATEGIES OR REAL DESIGN PROPOSALS?

Dario Trabucco

With a quick glance at the results of the Tall Stones of Venice student design workshop one can perceive that most of the students' projects differ remarkably from the designs elaborated in other similar exercises elsewhere. The students attending this workshop were originally inspired by the same models and the same ideas that characterize nowadays design culture on tall buildings. In fact, most of them were not at their first design experience of a tall building, and everybody had a genuine interesest and awareness on this particular building typology. Environmental sustainability was, of course, one of the most stringent demands from the workshop didactic staff. A part from being an element of the design brief, sustainability is one of the most challenging aspects that have to be faced in nowadays architectural practice: in fact, environmental sustainability is not just an ethic principle, but it is also a very important aspect of the marketing of skyscrapers and, to some extent, a mandatory law requirement, especially in European countries.
Awareness on such topics have caused, from the 1974 energy crisis onward, an evolution of building practice, most strikingly in the design of tall buildings. The aspect of tall buildings has dramatically changed, and the most evident differences can



1

be seen through the comparison of some "international style" towers (such as the Fiat Tower in Paris, the Sears in Chicago or the more recent Trump World Tower in New York) **[1]** and some recent manifestos of "green" architecture, such as the Commerzbank in Frankfurt, the Menara Mesiniaga in Kuala Lumpur or the Bahrain WTC.

Academic activities and student projects, as they are inspired by research and didactic purposes, can explore the design possibilities a little further from the actual state of the art of the building practice and test innovative solutions that will eventually be applied on future "real-world" buildings. Such approach, that stems from the interaction of academic research and building practice, has been successfully undertaken by various architects, most notably by Kenneth Yeang in his seminal books and landmark buildings.

Still, the workshop idea is the importance for students to focus their activity on realistic and feasible projects and the design activity of the Tall Stones of Venice workshop has been carried on with the mandate to provide feasible design proposals. The effort of the didactic figures was to convince students that reality is not a limit to the expression of architectural ideas, but it is a

force that transforms dreams into creativity, from which real buildings can be carved out.
The concept of sustainability embraces many aspects of our life and economy: we can talk about social sustainability, economic sustainability, environmental sustainability, etc.
In architectural terms, in addition to an obvious principle of economic sustainability (especially in the tall building industry, as skyscrapers are highly speculative investments), the idea of environmental sustainability is now an essential requirement.
Environmental sustainability is a complicate concept on its own: in fact, it doesn't imply only the preservation of energy, but it should also include a vast range of other parameters, such as the preservation of water, land, building materials, air pureness, etc.
However, the idea of environmental sustainability has been simplified over the years and it coincides now (to a great extent) with energy preservation. Energy preservation has then become an important characteristic for all post-energy crisis buildings that have to comply with more and more stringent building codes. Some buildings push the boundary a bit further and tend toward very high levels of energy efficiency. Eventually, several proposals have been presented for Zero Energy tall buildings: such towers are supposed to produce, thanks to the exploitation of renewable energy sources on site (such as wind or sun), enough energy to compensate their average consumption.
Has the limit of sustainability been reached by such buildings? The capability to produce energy and to reduce energy consumption to the lowest level may not be a sign of great sustainability though, unless such result has been carefully assessed through a Life Cycle Energy Analysis.
Energy, in fact, is used not just during the daily use of the building, but it is also employed during its construction and, indirectly, during the production of the materials the building is made of. Such energy is called initial embodied energy and it represents an important share of the Life Cycle energy consumption of the tower.
Additionally, a building needs energy to be maintained and repaired (recurrent embodied energy) and, finally, energy to be demolished. The Lifecycle energy consumption of the building is therefore a value that combines initial and recurrent embodied

energy, running energy consumption and demolition energy.
The design activity of the participants to the Tall Stones of Venice workshop has been guided with a clear focus on the environmental sustainability and energy performance from a lifecycle perspective, rather than from the more limited running energy point of view. Therefore, students have been guided through the choice of the most convenient solutions in terms of energy preservation in general, thus considering attentively also the construction phase of the tall building, the choice of the building materials, of the structural scheme etc. This whole approach toward tall building environmental sustainability, spurs from the research activity carried out at IUAV on this topic.
Life Cycle Assessment is a comprehensive methodology that allows the assessment of materials, components, or design choices from a life cycle point of view. The general methodology is regulated by ISO norms 14040 and 14044 that describe the accounting principles for all source of inputs and outputs involved in the production of any material good or service.
The methodology is complex and the results are long to be calculated. For this reason it has not been possible to transmit to the students the tools to perform such analysis on their own, given the limited length of the 3 week intensive workshop. However, principles of lifecycle energy efficiency have been divulged and debated during the didactic activity and, more importantly, during the discussion of the students' projects.
A sort of "lifecycle-thinking" has been used to guide students toward the assessment of multiple design choices, and different levels of analysis have been adopted informally throughout the design activity.
In fact, lifecycle thinking can be adopted at its fullest when assessing the opportunity to adopt something - a building material, a component, a particular technology - that impacts on the energy consumption of the tower. In this case, the positive effects of the adoption of such design feature should be benchmarked against the embodied energy required to produce and install it, and against its expected life span. For instance, an insulation material, provides a positive effect on the building energy consumption but its embodied energy must be added to the total embodied energy of the building where it is

adopted. Of course, it is easy to understand the overall benefits of a layer of insulation material, but the analysis is not equally straightforward in the case of more complex items, such as double skin facades, triple layered glass, etc.
Now that good results of energy efficiency have been achieved, it is important to address a question on the boundary of convenience for those measures: in fact, for the law of the diminishing returns, it is more and more difficult to attain better results and it should be carefully assessed the limit of the energy efficiency of our actions. In fact, even in the simple example of insulation materials, there is a point where the provision of additional insulation to achieve lower U values is not efficient, not just from a practical or an economical perspective, but also from an environmental point of view. After a certain level, the embodied energy of the additional material will not be compensated by a lower consumption of the tall building, thus resulting in a less efficient design from a life cycle perspective.
For this reason, the students' design activity has been oriented toward a less obvious approach to the topic of sustainability. In the last decade especially, we have seen a dramatic proliferation of design proposals that transmitted the idea of sustainability by means of some standard "ingredients", combined together in different ways:

Wind turbines, located on the roof of the building or throughout its vertical development;

Photovoltaic panels, applied on the roof or to the facades of the building;

Provision of vegetation at height in the interior or the exterior of the building both planted on horizontal terraces or on the verticality of the walls.

Indeed, it has to be acknowledged the important role of the marketing strategies adopted by realtors: if the market is asking for sustainability, there is nothing more impacting on the passer-by than the smooth movement of a wind turbine! On the other hand, despite the countless students designs that have proposed wind turbines on tall buildings and the dozens of actual proposals by renown architects, only a handful buildings exists at the moment that successfully integrate such kind of energy production devices. The reasons for this are

complex and embrace several aspects related both to economic convenience, structural or comfort issues, and doubts on the real efficacy of wind turbines in particular contexts: in addition to this, the few buildings that have large scale wind turbines have proven that the actual energy production by those means is much lower than the expected output. The same happens for the other typical "ingredients" of the sustainable tall building "receipt": both PV panels and green elements are abundantly present in proposals and "visions", but are very rarely kept when transforming such projects into real buildings. Cost, technical constraints, or fear of failure generally prevent developers to turn such design features into reality, especially when tall buildings are designed for compact urban environments.

Of course, it has to be acknowledged the "didactic" role that such elements can have on the population: despite the wind turbines on the Strata Tower in London are probably not very efficient in terms of energy production (if compared to the whole building consumption), for sure they act as a reminder for all the londoners on the importance of sustainability: eventually, more energy is saved by those who are inspired by its rotating blades on the city skyline than the energy produced by their actual movement.

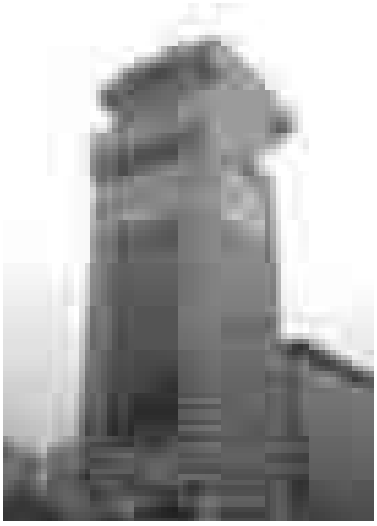
With this idea in mind, students attending the workshop have been encouraged to consider also other sustainable principles. A great deal of work was focussed on the development of efficient structural systems. The support of several structural engineers that discussed together with the students the load bearing elements of their towers, was crucial in the identification of the most convincing structural form. Before entering into the details of this aspect it must be mentioned another important statement of the workshop: ethic design. Though allowing a complete freedom for the students to develop their designs and to explore complex geometries, they were always asked to motivate their design choices and to provide a sound "reason" for all the building elements they conceived. In fact, even if we are now able to calculate even the most complex structures and we can probably find somebody who is able and willing to pay for them, architects should also feel responsible for their choices and for the impacts on the environment that these can have. The

structural system of a tall building is responsible for a very high share of its embodied energy, for the combined effect of the great quantities of structural materials needed and the great embodied energy of concrete and steel.
The iconic aspect of several tall buildings completed in the last decade worldwide is, again, a marketing strategy of developers. In the first century of their history, along with speculative purposes, tall buildings were the emblem of the economic success of corporates and individuals. This is clearly reflected by the names of many buildings, that came to celebrate wealthy companies and families, such as the Woolworths, the Rockefellers, or companies as the Equitable, Singer, Pan Am, etc. Today, tall buildings have evolved into symbols for the city or the country where they reside, as shown by more recent naming trends such as Taipei 101, Burj Dubai (now renamed Burj Khalifa), Moscow Tower, etc. and their promotional role is targeted to the whole world. Tall buildings are therefore often carved out as sculptural design objects, enlarged to the building scale to promote an image of power and technical capabilities.
Designs such as the CCTV in Beijing **[2]**, the Capital Gate Tower in Abu Dhabi or the Marina Sands Bay Hotel in Singapore are incredible structures that have perfectly reached their goal: the tall building community as well as the media of the entire globe have talked about them, increasing their popularity and complimenting with their designers and owners **[3].** Such towers, that mark the skyline of their home cities, have been built just because we are now able to calculate complex structures, but there is not much rationale behind their design. This family of iconic towers are just temporary icons in the tall building panorama, as their uniqueness is based just on their exceptionality: when a more tilting building will be erected, or a larger sky deck will shade its neighborhood, or a crazier shape will stem from the ground, such towers will be probably forgotten. On the contrary, if a strong "reason" sustains even the most complex design, the tower becomes an iconic skyscraper and the building or economic efforts required for its construction are fully justified: for instance, the dramatic span of the Grande Arche in Paris is used to reinforce and extend the road axis that from the Louvre Building passes beneath the Arc de Triomphe

2

du Corrousel, and stretches for kilometers throughout the Tuileries gardens, the Champs Elysées, L' Arc de Triomphe and the Avenue De Gaulle. This is an iconic tall building! **[4]**
Thus, the results of the Tall Stones of Venice workshop reflect this mentality, and complex structures resulting from capricious design ideas have been discouraged. Therefore the structural schemes developed by the students try to reflect a clear geometry, driving the forces to the ground in the easiest way. The sense of "simplicity" transmitted by some of the student designs has not to be regarded as something negative, but as the result of a - sometimes difficult - design research.
For the same principle, another key element of the design of a tall building was treated with particular care: the design of the service core. Normally, within a given footprint, the layout of a tall building should aim at the highest level of usable floor area, as this increases the developer's profit for the economic investment. From the point of view of sustainability, this matches with an efficient use of the built space and a consequent saving in terms of embodied energy per floor area. The total area of a building can be divided into Net Usable Area (NUA) and Service Area (SA). The NUA can be effectively

4



3

used as office space, residential, hotel etc., whereas the SA (occupied by the service core) is the space necessary to make the building functional, accessible and comfortable. In building practice, the developer's objective is to maximize the NUA against the Gross Floor Area (GFA), thus the higher the NUA/GFA ratio, the more efficient the use of space and profit from the investment. If the amount of NUA required can be achieved with an efficient use of space, then the GFA of the building will be smaller than that obtained through a poorer design. Therefore, besides sound economic reasons, the efficient use of the built space can lead to important savings in terms of material use, and subsequently of embodied energy
On an average, 90 % to 75% of the building floor area is usable space, with the higher ratio in short towers and a decreasing efficiency in the taller buildings: such trend can be considered a characteristic feature of tall buildings. This means that the service core takes the corresponding 10 - 25% of the built surface and an equivalent share of embodied energy. By reducing this figure, the embodied energy of the whole building can decrease accordingly. For example, estimations on the 30 St. Mary Axe building in London show that the embodied energy of a 40 story building can be as high as 1.500.000 GJ

with a NUA/GFA ratio of 0,8. An improved design of the tower increases the NUA/GFA ratio to 0,85 and can result in a building with the same NUA but much smaller, with savings in terms of embodied energy of 75.000 GJ and a further decrease of surface-dependent running energy (lighting, HVAC, etc.). For reference, the total primary energy consumption is roughly 28.000 GJ/year; therefore, the proposed NUA/GFA amelioration equals three years of energy consumption.

Students have been guided toward an attentive design of the service core of their tall buildings, also thanks to the support of vertical transportation experts that have informed them on the latest achievements of the lift industries.

The projects of the students who attended the Tall Stones of Venice workshop aim to develop a more comprehensive approach toward the topic of environmental sustainability and architecture. Probably, they don't declare the sustainable approach through a distinctive form; rather, they state a general principle that should become more common in the years to come. Energy efficiency is clearly an important topic for architects and engineers, and an important goal for their buildings. On the other hand, they should also remember that energy is needed also on the production phase of materials, components and buildings.

This energy, that is called embodied energy, is often ignored by many. Provided that important levels of energy efficiency are today required by building codes in all developed countries, the attention have now to be focussed on reducing the embodied energy of the built environment. Tall buildings, because of their inherent characteristics, are a typology characterized by an high embodied energy content. This if often worsened by the designers' decisions and by a lack of knowledge on this topic. Designers should remember that their choices can have a significant and definitive impact on the embodied energy of the building by the definition of its shape, core design, structural system, materials, etc, while they can have a more marginal influence on its running energy needs which are somehow influenced also by "external" parameters that are out of the designer's control, such as the efficiency of the office equipment contained in the building (computers, lighting, etc.) or the user's habits.

FROM THE ORTHOGONAL TO THE IRREGULAR: INNOVATION IN TALL BUILDINGS FORM

Philip Oldfield (University of Nottingham)
Antony Wood (CTBUH - IIT)

Since the birth of the typology in late 19th Century North America, the form of tall buildings has remained relatively consistent, often restricted to the vertical extrapolation of an efficient floorplan. Dictated by commerce, this has created the rectilinear glass and steel boxes that dominate urban landscapes around the world. Innovation in building form has often been restricted to an elaborate entrance at the base of towers, an ornate crown or spire at the top, and very little in between. Perhaps the only major deviation away from this was seen in pre-war North America with the development of the 1916 New York Zoning law.

This required tall buildings to preserve the penetration of light and air onto the streets below by prescribing 'set-backs', creating the familiar 'wedding cake' skyscraper form that dominated skylines of the time (Oldfield et al, 2009). However, even the iconic tall buildings that emerged from this phase, such as the Chrysler BuildiWng (1930) and Empire State Building (1931) showed little development from the commercial model in terms of both form and internal space.

However, recent years have seen dramatic changes in tall building form, with a paradigm shift from the orthogonal to

1

the irregular. Modern design and analysis tools, along with developments in building materials and structural systems have liberated the designer from the orthogonal, allowing tall buildings of seemingly impossible shapes and unusual forms to appear on skylines around the world.

This trend for articulated and irregular-shaped towers was recognised by the CTBUH as the theme for its 2006 international conference "Thinking Outside the Box: Tapered, Tilted, Twisted Towers" held in Chicago (Wood, 2007). Nowhere is this trend more apparent than in the creation of the CCTV Building in Beijing. Designed by the Office for Metropolitan Architecture, it combines the entire TV-making process into a single loop of interconnected activities around four physical elements: a nine-storey 'base', two leaning towers that slope at six degrees in each direction, and a nine to 13-storey 'overhang', suspended 36 storeys in the air (Carroll et al, 2008). The result is a revolutionary design, not only in terms of its gravity defying form, but also structurally and functionally **[1]**. It could be argued then, that the tall building typology has developed to its most advanced state, given the seemingly endless opportunities now available to the designer.

Yet when examined in more detail it is clear that many irregular and complex tall building forms are simply designed as iconic pieces of high-rise urban 'sculpture', with little relationship to the climate, culture and context within which they are located. Whilst there have obviously been advances, it seems irregular and unusual tall building forms are often only created as icons, in order to project the vitality of their city on a global scale – creating skylines with brand recognition on an international level.

Historically, height has been the primary driver in creating an architectural icon to soar above the city, as typified in the continued race for the world's (and region's, country's, city's, etc) tallest building. Today, form plays an equal, if not greater role in the creation of a high-rise icon, with cities and developers around the world clambering to have their own twisted, leaning or articulated towers.

"The skyscraper is the architectural form that has dominated the imaginations of city-planners charged with ensuring that their cities come out well in the competition for global attention." [Kong, 2007]

This quest for high-rise icons has led to the syndrome of tall buildings as 'isolationist' architecture – stand-alone, non-site specific models that are readily transportable around the cities of the world. What makes them specific to the time and place in which they are set, rather than just another part of the 'global' high-rise mono-culture which is sweeping the world and homogenising 'local' cultures in its path?

The tall building is obviously not a typology to 'blend in' with its context. It is inevitably going to soar above, and dominate, its surroundings. But that does not mean it cannot become a positive element in the urban composition.

It can, and should, relate to its surroundings as positively as a high-quality, low-rise building, taking its cue from site and environment, as well as the desire to create a visual icon.

"There is much more to our current place in architectural history than symbol and iconography.

Rather than symbol, the specifics of each environmental condition, culture, lifestyle and the tools and methods we use to build should be the basis for a new kind of high-rise building that would inherently "add value" but also transform cities." [Gang, 2008]

Unfortunately, it seems, despite the many opportunities available for new and innovative forms to progress the tall building typology, too often form seems only to be manipulated for forms sake.

Opportunities for Innovation in Tall Building Form

Whilst there are obviously many challenges in creating irregular and articulated tall building forms (predominantly structural and constructional challenges – for more on these see Scott et al., 2008), there can be no doubt that such forms have the potential to reinvent the high-rise typology and make a positive impact on cities around the world.

Outlined below are three opportunities for future innovation in tall building form. These opportunities could provide a starting point for new tall building forms that go beyond the standard orthogonal box, but also beyond the sculptural icon. They demonstrate how tall building forms can respond better to place and the environment, achieve greater heights and accommodate new and radical functions at height in our cities.

Sustainability and the Environment

In today's context, with climate change arguably the greatest challenge of the modern world, it is well known that the built environment is a significant contributor to global greenhouse gas emissions, with buildings accountable for 30–40% of all primary energy used worldwide (UNEP, 2007). Against this backdrop, the international community is still divided on the sustainability credentials of tall buildings as an appropriate typology in our existing and future urban centres. There are those that believe that the concentration of population through high-density (therefore reducing transport costs and urban / sub-urban spread) combined with the economies of scale of building tall, make the typology an inherently sustainable option. On the other hand, some believe that the embodied energies involved in constructing at height, combined with the impact on the urban realm, make them inherently anti-environmental (Roaf et al, 2005). Innovation in tall building form then should play a significant role in improving the environmental credentials of high-rise. In particular tall buildings need to better respond to local climate, by employing specific strategies for building form

and orientation relative to sun and wind, for example to reduce unwanted solar gain and encourage passive ventilation.

"As the location's most endemic factor, climate provides the designer with a legitimate starting point for architectural expression in the endeavour to design in relation to place, because climate is one of the dominant determinants of the local inhabitants' lifestyle and the landscape's ecology." [Yeang, 1996]

Whilst many tall buildings fail to respond adequately to climate, there are fortunately a growing number of examples that are using appropriate environmental response as the main design generator for form. One of the earliest examples is the National Commercial Bank designed by Skidmore, Owings & Merrill and completed in 1984. Located in the hot solar extreme of Jeddah, Saudi Arabia, the design inverts the glass curtain wall away from direct solar gain to occupy the 'internal' face of the skyscraper, shielded to the outside by strategically-positioned skygardens cut into each face of the triangular plan.

A similar form was later employed to even greater effect by Norman Foster in his 1997 Commerzbank tower, Frankfurt. Ken Yeang's Menara Mesiniaga, completed in Kuala Lumpur in 1992, uses a form that changes throughout its height to respond to climate. Here the lift core is moved to the building perimeter to shade internal spaces, whilst skycourts, carved out of the form, accommodate continual landscaping and vegetation. A more recent example is Studio Gang's proposed Solstice tower which responds directly to Chicago's sun-path through its geometry. The inclined saw-tooth form of the south facade is designed to shade occupied spaces from the harsh summer sun, reducing solar heat gain, but allowing for passive solar heating in winter months when the sun path is lower **[2]**. For further examples see Wood, 2008.

Innovation in tall building form can also be used to harness on-site energy generation from low and zero-carbon sources. The aerodynamic forms of the Bahrain World Trade Center (Manama), Pearl River Tower (Guangzhou) and Strata Tower (London) for example, all serve to accelerate wind onto turbines, thus generating clean energy.

There can be little denying that such forms are also visually exciting.

2

Wind and Structural Engineering

A further opportunity for innovation is the development of tall building forms that offer reduced wind loads and increased structural efficiency, therefore allowing greater heights to be achieved with reduced material quantities. Significant research has been, and continues to be, undertaken to examine the impact tall building forms have on wind loading and building motion (Denoon, 2006; Irwin et al, 2008). Compared to orthogonal and symmetrical forms, it seems that irregular forms can be advantageous here. Whilst they may pose challenges to structural engineers in the development of the structural framework, irregular forms can assist in reducing wind load effects and building responses (Ali & Moon, 2007).

Tall building designs – particularly those that are reaching significant heights – are often tested and refined in wind tunnels as part of the design process, as small changes in building form and shape can have substantial implications on structure and wind loading and therefore quantity of materials and cost. In the quest to design some of the tallest buildings in the world, the development of an appropriate form to resist the huge wind loads at height becomes vital.

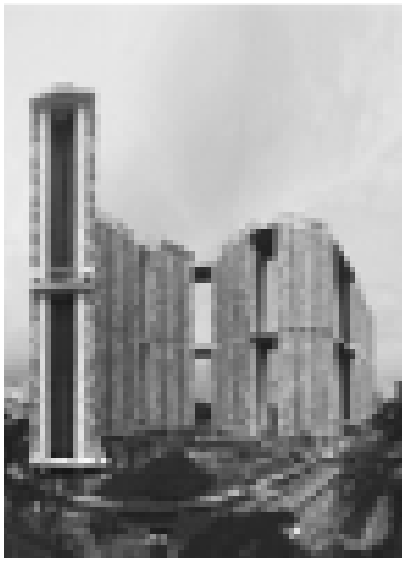
The form and geometry of the Burk Khalifa, the world's current tallest building at a staggering 828 metres in height, was evolved and optimised through several rounds of wind tunnel testing **[3]**. This process resulted in a substantial reduction in wind forces on the tower by 'confusing' the wind through encouraging disorganised vortex shedding over the height of the tower (Baker et al., 2007). There can also be environmental and economic benefits to optimising tall building form with respect to the wind. The spiralling asymmetrical form of the 632 meter-tall Shanghai Tower, designed by Gensler, results in a 24% reduction in wind loads, which in turn results in a 32% reduction in structural material requirements (Gensler, 2009). These reductions will save $58 million USD from the building construction costs, but will also save thousands of tonnes of steel and concrete from the structure. With materials and construction typically responsible for around 20% of total building life-cycle impacts (Kestner, 2009), such savings will be significant in reducing the tower's overall carbon footprint.

Connectivity and Conjoined Towers

Perhaps the next major trend in new and innovate tall building forms will be that of conjoined and interconnected towers. As urban populations increase in the coming decades, it is likely that cities will look to accommodate 'horizontal' land-consuming functions vertically in the sky, thus challenging the traditional functions of office, residential and hotel which predominate in tall buildings. The challenge to designers then is to develop new tall building forms that can house parks, sports and leisure facilities, schools, farming and other social and communal functions at height, lifting the richness and vitality of the city into the sky. A potential solution to this design problem is to conjoin towers together to create larger spaces at height, or to support these horizontal functions as skybridges between vertical towers.

It seems nonsensical to many, including the authors, that in our dense multi-storey cities the only physical level of connectivity is at the ground plane or subway. Providing links between towers at height would serve to break down the tall building as isolationist architecture, improving urban enrichment and creating opportunities for a public domain in the sky.

3

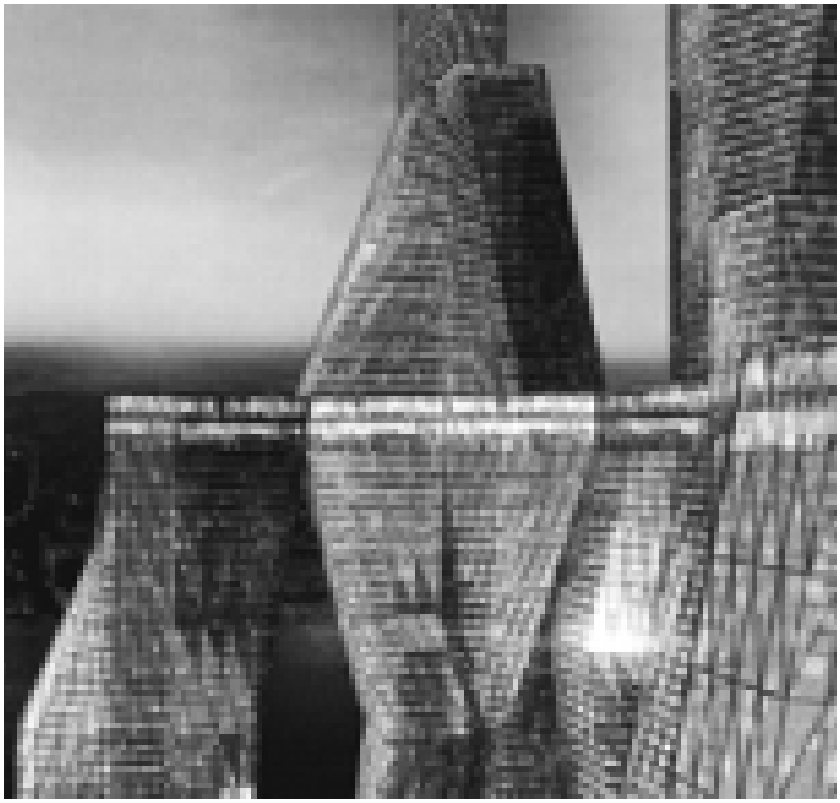


4

In addition, connections at height can also improve the safety of tall buildings by introducing horizontal evacuation, especially in the wake of 9/11. The concept of being able to evacuate occupants at a level other than the ground, should the building be at risk, seems sensible, especially if any emergency in a tall building effectively cuts off vertical evacuation routes and thus the connection to the ground plane (for more on this see Wood, 2003).

Whilst these ideas may seem radical, they are already being realised in tall buildings around the world. ARC Studio's Pinnacle @ Duxton in Singapore comprises seven residential towers with wide, open skygardens weaving between them on the 26th and 50th stories. The skygardens provide large green spaces for residents and the public alike, with the added benefits of security and fantastic views over the city **[4]**.

Also in Singapore, Marina Bay Sands, designed by Moshe Safdie with Aedas comprises three gently curving towers capped by a 340 meter long skypark at its apex. In both cases, the skybridges are a key element in the architectural language and form of the building and the intended experience of the user.



5

Proposed examples of connected tall building forms are often more radical still. Many of the unrealised proposals for the World Trade Center re-design competition, sponsored by the Lower Manhattan Development Corporation and the Port Authority of New York and New Jersey (Stephens, 2004) included some form of linkage at height between towers. The scheme by United Architects, for example, consisted of five crystalline towers leaning into one another and fusing together at around 240 metres high, creating what seems to be a single cathedral-like building **[5]**.

Where they collide, they create five continuous floors of public amenities linking all the towers together. In addition, this offers improved safety through multiple evacuation routes and sprinkler systems with multiple sources of water pressure (Wood & Oldfield).

With all this in mind, it is exciting then to see the wide variety of student design proposals generated as part of the Tall Stones of Venice Workshop. The brief and site were clearly challenging, yet examination of the student projects demonstrates that evocative forms can be derived out of exactly such challenging circumstances. For example, the twisting twin towers by Chiara De Gennaro, Patrick Lim, Sara Maschietto and Elena Squizzato are no doubt elegant and iconic, and yet, these forms come from a unique quality of the site – the views it offers. The students' starting point was an acknowledgement that the lower floors only had a good view east, to the island, and yet as the tower rose, better views of Venice to the south east became available. As such, the tower's twist was generated directly from this idea, turning from one set of views, to face another. The form of the design produced by Melissa Cappozzo, Guido Pantani and Marina Tenace also responds to its location. Here, the tower is lifted up and chamfered at its base creating a marina beneath the tower – a very Venetian idea – whilst a vast wall of brise soleil is hung from the south facade, creating shading where it is needed most. This is clearly a design that responds to both the cultural characteristics of Venice and the environment.

It is exactly this kind of thinking, using tall building form to respond to the qualities and challenges of climate, culture and context that will progress the typology beyond merely iconic status, and allow it to play a key role in the sustainable cities of the future.

AN ARCHITECTURE OF REASON

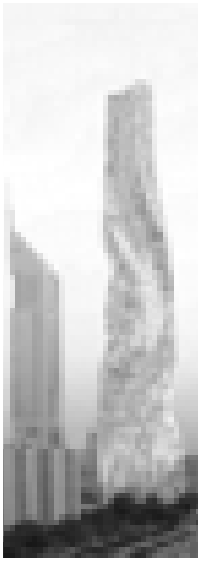
Harry Wolf (Fellow of the American Institute of Architects)
Opening lecture of VAA "Tall Stones of Venice" 2011 workshop

I'm given to understand that this workshop for students is to be known as "The Tall Stones of Venice" so let me say how pleased I am to be here among Mr Ruskin's inspirations both small and tall.
Given the complexity and the latitude of the brief one might say the students face a "tall order".
May I also recognize the Council on Tall Buildings and Urban Habitat as a Co-operating Organization; Studio Altieri the Main Sponsor, and Permasteelisa, Supporting Contributors.If the purpose of a University is to teach students to think critically, reason analytically, solve problems and communicate clearly and to that I might add, look critically, then for me that is the goal of this workshop.
I entitled this lecture, "reason" because of the sights one sees as representative of architecture today. The distinguished Art and Architectural Critic Joseph Rykwert said, when asked about some remarks on a art exhibition;

" I cannot accept the operating of the art-market in the interest of exhibitionist personalities, however charismatic, as an entertaining and harmless diversion. It is a camouflage for

1

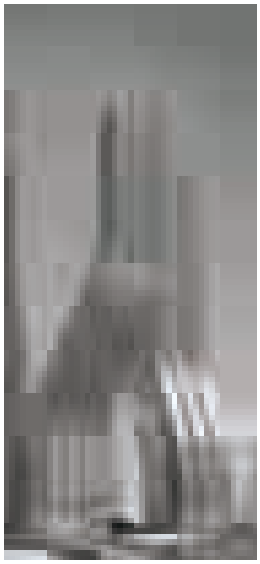
2



3

the sinister forces which degrade the quality of our lives, and to tolerate it means that you accept the alibi of the despoilers of our visual environment."

I have to agree and I point to the following as examples of architecture's equivalent exhibitionistic buildings like Abu Dhabi's limpid gate, clearly an eastern rejection of Viagra as Western decadence **[1]**.
Then there is the wigglies, symbolizing dancing eels from some Disney movie – should have stayed under the water **[2]**.
Deconstruction was, I thought, a failed movement a number of years ago but there seems to be a revival **[3]**.
One is ceaselessly amazed at the sources of inspiration, here clearly the influence of a Caribbean dance known as the Limbo- all in an effort to be on the cutting edge **[4/5]**.
Now we can have fun with these but they are or might have been real buildings by people who have the honor to carry the title architect.
I was going to call this lecture ;
Harold Pinter, Ortega y Gasset and other Rolling Stones



4

5

Pinter said

"…Despite the enormous odds which exist, unflinching, unswerving fierce intellectual determination as citizens to find the real truth of our lives and our societies is a crucial obligation which devolves on us all, it is in fact mandatory."

Are those architectural jokes the real truth of our society? I think not, I think they are unreasonable ego demonstrations seeking attention to land the next big fish and their existence can be explained by the second man in my auxiliary title;

Ortega y Gasset said:

"During the Restoration (1874 - 1923 - Restoration of the Spanish Monarchy) the sensitivity for anything really strong, excellent, whole and profound was lost… purity did not move the heart: the quality of perfection and loftiness was invisible like an ultra-violet ray and inevitably, the mediocre and frivolous seemed to become more prevalent." "…in good faith men applauded mediocrity because they had no experience of the profound."
They don't know the difference, neither client nor architect.
I want to make the argument tonight that architecture needs be

about reason, reason as the springboard for creativity, reason in the making of the art of architecture.

So first let us talk of the nature and role in culture of architecture as an art.

Tolstoi said;

"Art is a human activity having for its purpose the transmission to others of the highest and best feelings to which men have risen."

Pascal said:

"Man is but a reed, the most flexible thing in nature, but man is a thinking reed"

Bellow said:

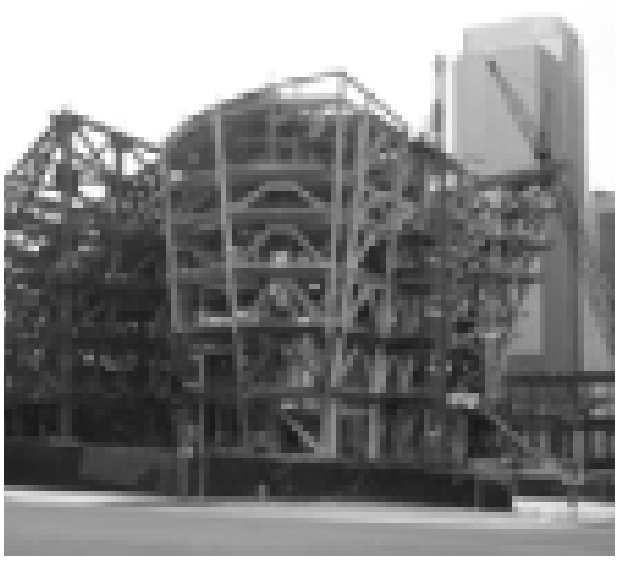
"Art attempts to find in the universe, in matter as well as in the facts of life, what is fundamental, enduring, essential."

So architecture as art is a means by which we transmit our values, by which we say to the future, here, these are our beliefs, we hold these things important….and the capacity to endure- to speak to the future is critical.This then is why architecture needs be about reason. It is not something made in a particular way because the architect "felt" like it, or worse yet a funny shape appears because he could technically make it, not because it was called for. That is mere ego and ego is not enduring, not essential, only indulgence. Architecture is the work, for and with reason! - Pascal's thinking reed.

There is a new imperative for reason and reasonableness, my theme, REASON, is critical if we are follow Pinter's challenge "… fierce intellectual determination as citizens to find the real truth of our lives and our societies …"

There is a book just out by Australian environmentalist Paul Gilding, "The Great Disruption: Why the Climate Crisis Will Bring On the End of Shopping and the Birth of a New World." Tom Friedman introduced the book by saying;

"You really do have to wonder whether a few years from



6

7

now we'll look back at the first decade of the 21st century — when food prices spiked, energy prices soared, world population surged, tornados plowed through cities, floods and droughts set records, populations were displaced and governments were threatened by the confluence of it all — and ask ourselves: What were we thinking? How did we not panic when the evidence was so obvious that we'd crossed some growth/climate/natural resource/population redlines all at once?"

To bring home his point, Gilding refers to the work of an alliance of scientists known as The Global Footprint Network. This GFN calculates the land and water area we need to sustain the current growth rate, that is, to produce the resources we consume and to absorb our waste - given current technology. They measure this in how many "Planet Earths" we need. Right now we are at 1.5 Planets! Having only one at our disposal – no pun intended - would seem to present a problem. Reasoned, reasonable behavior? I think not.
Sadly, some of the best know architects today are consuming earth's resources in a flagrant fashion, and no one calls them to

8

task. Heeding Rykwert I will.
If we examine just one aspect of the price of ego superseding reason we can look at Disney Hall**[6]**.
There is so much steel in this building that you can't see thru it, even when the skin is not yet on. Many times more steel than comparable halls. You can almost see the structural engineer darting frantically about; quickly, a column here, another beam here. Oops I need a strut…
Beijing's birds nest stadium **[7]**.
In a highly unusual move, a group of Chinese engineers protested that this concept necessitated an extravagant 110,000tons amount of steel. Wikipedia reveals that "In an attempt to hide steel supports for the retractable roof… the team developed the random-looking additional steel to blend the supports into the rest of the stadium",
and the engineers own website says "The design leaves spectators wondering which aspects of the structure are functional and which have been included for appearance alone.".
Steel décor!
The famed CCTV Building **[8]**.
Described as "a three-dimensional cranked loop", the

engineer's website proclaims "The building's design defies the laws of gravity". The foundation alone needed keep the tower from toppling, required 190 days for excavation. It is said to support the building but it is really supporting ego.
"Because we can" is not reason, it is not thinking critically, it is morally reprehensible in this age of going from 1 ½ earths to just one.

When I was at MIT Kenzo Tange was one of the visiting critics (no, that's not Yoda). The twin Olympic stadia of 1964 were for me his greatest buildings. You can see the cables suspended from the ridge and attached to the concrete perimeter circle in grace and economy.
Poetry from reason. He would give crits by going from board to board, seat himself, look at the drawings in progress and say…

"ah so… ah so, then he would pause and say… ahhhh so, finally he would say,ah so! and move to the next table."

I'm not sure we learned what we might have but I remember years later my friend the late Jim Freed, one of IM Pei's Partners, talking about his days at IIT when you would pin up a drawing for Mies to critique.
Mies would come over, he would sit with one hip on the stool with his ever present cigar. He would take a puff, look at the drawing… and he would look at the drawing… and he would look at the drawing, meanwhile you're standing there sweating bullets -seeing for the first time everything you did wrong and ever fearful that Mies would see them as well. Finally Mies would say something like, …"you do not have it yet…" and would move along.
As Jim said the greatest lesson that he learned was to develop the capacity to be self-critical and perhaps that's what Tange was about. So this lecture tonight is directed to the students, not the faculty, not the practitioners but to the students and it too is about being critically objective.
Architecture is the work, for and with reason!
The thinking reed.
It is not only in architecture. In painting it is also the work:

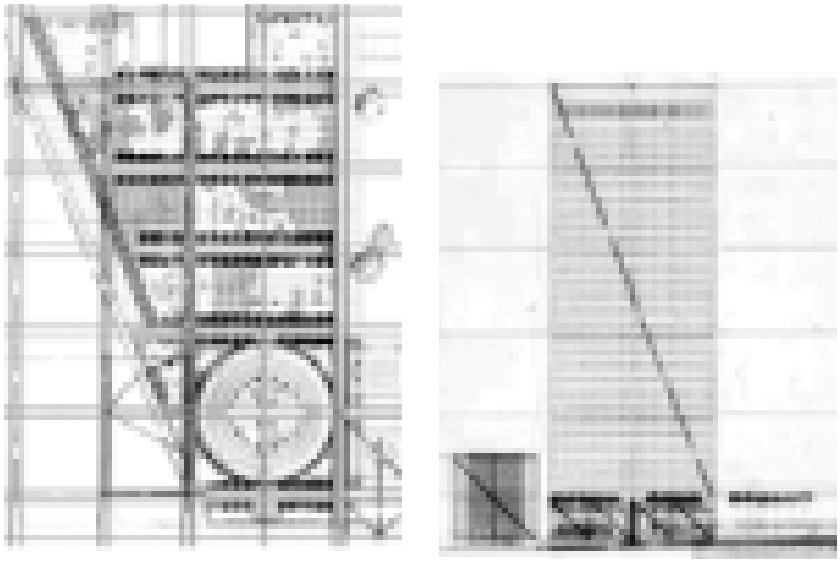
"Thomas Eakins, the greatest American artist before Abstract Expressionism, produced work which is styleless. There is no Eakins look. There is only a pitch of ambition and excellence."

It is not him, it is the work.
And in acting as well: " While the typical movie star plays versions of himself, myths have grown up around the rigor with which Daniel Day-Lewis got ready for roles, checked his ego at the door, and vanished inside." It is not him, it is the work.

Rebecca West said of art:

"Art is not a plaything, but a necessity, and its essence, form, is not a decorative adjustment but a cup into which life can be poured and lifted to the lips and be tasted."

So that is what we're about, a cup for the nectar of life.
And how to go about this?
There is an order to things.
Architecture, landscape, making buildings, shaping the land, these are not about impulse or fad, they are not about opportunities for individual ego expression- they are about



9

utilizing one's talents in the service of mankind.
About creating wondrous places that transport us from what is to what might be. And in my view they are about creating place as a backdrop for human events.Architecture was once about the way the winds blew and the sun fell. Buildings were rooted in their place and culture.
When that is ignored buildings become the same everywhere. When every place looks like every other, the experience of them is diminished, and when we diminish this experience we diminish man.It is the nature of place, each place, and the criticality of this understanding this and in illuminating the important and valuable differences in each.

"Place is climate, place is culture, place is light, is geology, is vegetation, is people."

If, as we begin each project we take the time to deeply understand and feel these differences then we have the chance to take them as cues for our beginnings. And if we look deeply at nature, we find that there is an order to things from quark to cosmos. And so for me I seek the nature and order of a place as a beginning for my work and I seek to bring within that work

an internal order with which to achieve a harmony and serenity, a peacefulness, a quietude to the spaces, to serve as balm and comfort to man's abraded psyche in this part of the 21st century.

I like Miles Davis who, when asked what he did, said

"Man, I just sit around trying to figure out what to leave out." For when you know what to leave out, you also know what to leave in and that is the essence.

As in perfume, essence is the powerful extract that moves the soul. To illustrate the use of reason, the discovery of geometry and proportion, particularities of spaces, of stripping away the extraneous and, I hope, leaving what is ordered, powerful and serene, I can show here my projects for Tampa **[9]** , Toulouse, Amsterdam **[10]** , San Diego, Washington DC, Santa Barbara, and Abu Dhabi.

My goal is as Clement Greenberg said of Barnett Newman's paintings:

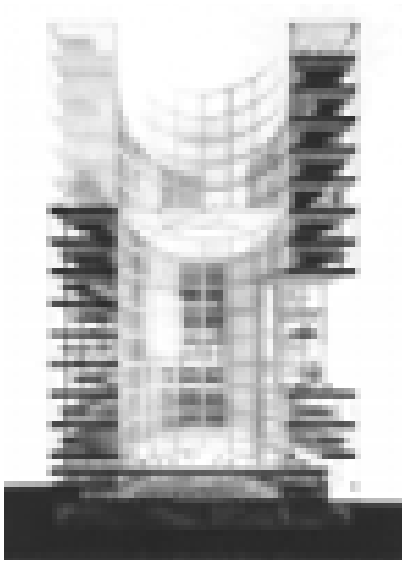
"…his art is all statement, all content; a fullness of content attained through an execution that calls the least possible attention to itself."

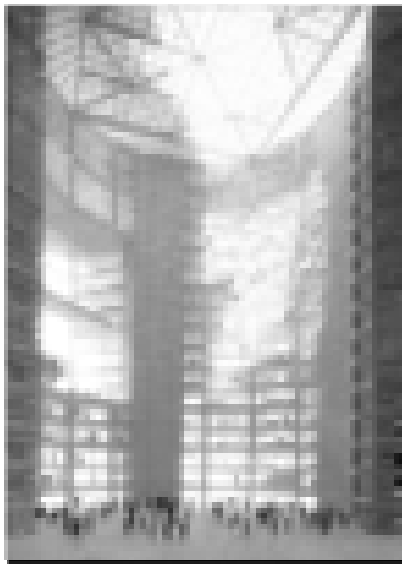
If we can synthesize the necessities of building; the Systems, the Structure, Climate and Culture, in support of the functioning imperatives, if we can synthesize these we have a chance to make music - and every now and then, if we have worked really hard and are maybe a little lucky, we can make a symphony. The Mesopotamians believed in finite life and with limited interest in the future built their pyramids of mud. The Egyptians believed in eternal life and with that preoccupation with the future built their monuments of stone.

"Believe what you will but build for the future."

9

9 Tampa tower (Tampa, Florida)
external view
view of interior space
10 ABN Amro Bank (Amsterdam)
Section model
interior view





10

BIBLIOGRAPHY

References:
"Sustainable tall buildings marketing strategies or real design proposal?"

Ali M. M., Armstrong P., *"Strategies for integrated design of sustainable tall buildings"*, Faculty of Architecture at University of Illinois at Urbania - Champaign: AIA Report on University research, 2006, pagg. 22.

Ali M. M., Moon K.S., "*Structural developments in tall buildings: current trends and future prospects*", Architectural Science Review volume 50, n° 3, 2007: 205-223.

Buchanan P., "*Reinventing the Sky-Scraper.*", A and U., n° 329, febbraio 1998: 30-67.

Moon K.S.,"*Material-Saving Design Strategies for Tall Building Structures*", atti del convegno internazionale: Tall&Green, CTBUH World Congress 2008, Dubai, UAE 2-5 Marzo 2008, a cura di Wood A., 135 - 142. Chicago: CTBUH, 2008.

Mujica F., History of the skyscraper, New York: Archaeology and architecture press, 1930

Oldfield P., Trabucco D., Wood A., "*Five Energy Generations of Tall Buildings: A Historical Analysis of Energy Consumption in High Rise Buildings*", atti del convegno internazionale: Tall&Green, CTBUH World Congress 2008, Dubai, UAE 2-5 Marzo 2008, a cura di Wood A., 300 - 310. Chicago: CTBUH, 2008.

Trabucco D., "*An analysis of the relationship between service cores and the embodied / running energy of tall buildings*", The structural design of tall and special buildings, Ed. Wiley, Volume 17 n° 5, 2008: 941-952

Trabucco D., "*Costruire in altezza: una sfida per la sostenibilità"*, Monfalcone: Edicom Edizioni, 2010, pagg.207

Willis C., "*Form Follows Finance, New York: Princeton Architectural Press"*, 1995, pagg. 224

Wood A., "*Green or Grey? The Aesthetics of Tall Building Sustainability*", atti del convegno internazionale: Tall&Green, CTBUH World Congress 2008, Dubai, UAE 2-5 Marzo 2008, a cura di Wood A., 195 - 202. Chicago: CTBUH, 2008.

References:
"From the orthogonal to the irregular: innovation in tall buildings form"

ALI, M. A. & MOON, K. S. (2007). "*Structural Developments in Tall Buildings: Current Trends and Future Prospects. Architectural Science Review"*, Vol. 50.3, pp.205 – 223.

CAROLL, C. CROSS, P., DUAN, X. GIBBONS, C. et al (2008). "*Case Study: CCTV Building – Headquarters and Cultural Center"*. CTBUH Journal, Issue 3, pp.14 – 24.

DENOON, R. (2006). Predicting Wind Effects and Performance of the Irregular. CTBUH Conference "*Thinking Outside the Box: Tapered, Tilted, Twisted Towers*", Chicago, October 25 – 26, 2006.

KONG, L. (2007). "*Cultural Icons and Urban Development in Asia: Economic Imperative, National Identity and Global City Status, Political Geography"*, 26, pp. 383 – 404.

GANG, J. (2008). "*Wanted: Tall Buildings Less Iconic, More Specific"*. Proceedings of the CTBUH 8th World Congress "*Tall & Green: Typology for a Sustainable Urban Future*." Dubai, 3 – 5 March, 2008, pp.496 – 502.

GENSLER, A. (2009). Shanghai Tower: Completing a Supertall Trio, CTBUH Conference "*Evolution of the Skyscraper: New Challenges in a World of Global Warming and Recession*", Chicago, October 22 – 23, 2009.

KESTNER, D. M. (2009). "*Sustainability: Thinking Beyond the Checklist".* Structure Magazine, June, 2009, p.5.

IRWIN, P., KILPATRICK, J. & FRISQUE, A. (2008). Friend or Foe: Wind at Height. Proceedings of the CTBUH 8th World Congress "*Tall & Green: Typology for a Sustainable Urban Future*." Dubai, 3–5 March, 2008, pp.336 – 342.

OLDFIELD, P. TRABUCCO, D. & WOOD, A. (2009). "*Five Energy Generations of Tall Buildings: An Historical Analysis of Energy Consumption in High-Rise Buildings"*. The Journal of Architecture, Vol. 14, No.5, pp.591 – 613.

ROAF, S., CRICHTON, D. & NICHOL, F. (2005). "*Adapting Buildings and Cities for Climate Change: A 21st Century Survival Guide",* Architectural Press, Oxford.

SCOTT, D. (2008). "*The Effects of Complex Geometry on Tall Towers"*. The Structural Design of Tall and Special Buildings, 16, pp.441 – 455.

STEPHENS, S. (2004). "*Imagining Ground Zero: Official and Unofficial Proposals for the World Trade Center Competition"*, Thames and Hudson, London.

UNEP (2007). "*Buildings and Climate Change: Status, Challenges and Opportunities"*, United Nations Environment Program, Nairobi.

WOOD, A. (2003). "*Pavements in the Sky: Use of the Skybridge in Tall Buildings"*. Architectural Research Quarterly, Vol. 7, No. 3 & 4, pp.325 – 333.

WOOD, A. (2007). "*Thinking Outside the Box: Tapered, Tilted, Twisted Towers"*. Proceeding of the CTBUH Chicago Conference 2006. 10-DVD set. Council on Tall Buildings and Urban Habitat, Chicago.

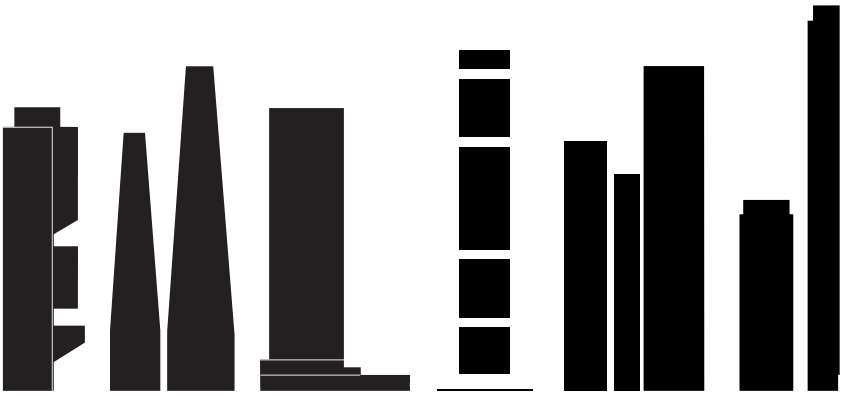
WOOD, A. & OLDFIELD, P. (2007). "*Bridging the Gap: An Analysis of Proposed Evacuation Links at Height in the World Trade Center Design Competition Entries"*. Architectural Science Review, Vol. 50.2, pp.173 – 180.

WOOD, A. (2008). "*Green or Grey? The Aesthetics of Tall Building Sustainability"*. Proceedings of the CTBUH 8th World Congress "Tall & Green: Typology for a Sustainable Urban Future." Dubai, 3 – 5 March, 2008, pp.194 – 202.

YEANG, K. (1996). "*The Skyscraper Bioclimatically Considered: A Design Primer"*. Wiley Academy, UK.

INTRODUCTION TO PROJECTS

International student Workshop



TEACHERS : Luigi Croce [UniUD] Harry Wolf [FAIA] Dario Trabucco [Iuav] [University of Nottingham]
LECTURES : Paolo Foraboschi [Iuav] Angelo Villa [Iuav] Antonio Capsoni [Politecnico di Milano] Enrico Fontanari [Iuav] Lucas Fornari [Studio Altieri] Giulio Altieri [Studio Altieri] Saul Papaleo [AGC glass] Martin Sycora [AGC glass] Alessandro Roversi [Schindler] **FINAL JURY :** Luigi Croce [UniUD] Mauro Bertagnin [UniUD] Roberto di Marco [Iuav] Massimiliano Fanzaga [Permasteelisa] Aldo Norsa [Iuav] Harry Wolf [FAIA] Dario Trabucco [Iuav] **STUDENTS :** Alexander Bibbo [Adelaide Univ] Elisa Bortolozzo [Iuav] Roberta Brucato [IIT] Melissa Capozzo [Iuav] Mattia Cester [Iuav] Alessandro Chiarcossi [UniUD] Eros Conte [Iuav] Jola Daberdaku [Iuav] Chiara De Gennaro [Iuav] [Iuav]

Mohamed Hamed Ebrahimi [University of Isfahan] Chiara Facchinello [Iuav] Veronica Feltre [Iuav] Giada Maria Genovino [UniUD] Matteo Giammartini [Sapienza] Natalia Gutierrez [UPM] Lim Hendy [University of Nottingham] Samie I Kayani [UCL Bartlett] Simone Luccichenti [Sapienza] Tim Magner [IIT] Luca Malvasi [Sapienza] Enrico Marzaro [Iuav] Sara Maschietto [Iuav] Shivani Ghazaleh Mathur [University of Isfahan] Nicola Pagnin [Iuav] Emanuele Paladin [Iuav] Guido Pantani [Iuav] Lucia Perissinotto [Iuav] Ludovico Pevere [Iuav] Chuyu Qiu [UoN] Marco Salvador [Iuav] Andrea Sartor [Iuav] Elly Spyrou [Univ of South Australia] Elena Squizzato [Iuav] Giuseppe Stella [Iuav] Marina Tenace [Iuav] Lorena Todaro [Iuav] Elisa Toscano [Iuav] Alessandra Trentin [Iuav] Willie Yogatama [UoN]

When Dario I and launched this Workshop “The Tall Stones of Venice” with the endorsement of the IUAV University of Venice and the Council on Tall Buildings and Urban Habitat, we would have never dreamt to receive applications from countries like Iran or [illegible] coming from ten different countries of the world . To such a cosmopolitan group of students we gave [illegible] (or a complex of towers) not exceeding the height of 240 meters as the focus point of a comprehensive redevelopment of a dismissed industrial area in the south of the residential zone of Marghera. On a larger

scale other consequences of the project should have been to create a bound between that borough and the city of Mestre and provide a gateway from the mainland to Venice and its lagoon. Why Marghera of all places, and why that particular area? To understand this we must step back in history. Before modern industrial developments, Marghera has always been marshland territory. Then at the beginning of the XXth century a huge project started to tranform this zone in the Industrial Port of Venice and a residential expansion south of Mestre (the so-called Marghera Garden City) to provide dwellings for all the people moving in this new zone. Our site borders to the east on via Fratelli Bandiera, beyond which there is the

Garden City and which lies in the original position of the Brenta channel dug by Venetians in the XIV century to deviate that river away from Venice; on the west [illegible] nucleus of the industrial port. A key place then, also in [illegible] Venice, which deviated the rivers to prevent silting in the lagoon, against machine-age insensitive approach to environment and pollution. The industrial zone of Marghera as a matter of fact became rapidly a source of pollution, especially with the '50s-'60s chemical plants boom and was the cause of the rapid worsening of the dangerous high-tides phenomenon when much deeper channels were excavated in the lagoon to let

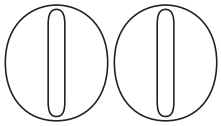
port. The situation in our days has completely and for some aspects dramatically changed. On the one hand a policy much more sensible and sensitive to the environment has been enforced, so that water and soil health is much better than it used to be only 20-30 years ago. On the other hand though, and for different

factories and plants of the industrial zone have closed down or are quite likely to do so in the very next future, leaving behind derelict sheds and polluted soil. The cost for reclaiming these former industrial zones would be enormous and what for? Our idea has been that only a complex and mixed use redevelopment, combining

marina and other recreational facilities would manage to attract the enormous resources necessary to tackle such a daring task. The presence of a tall building (or a group of tall buildings) was requested in order to constitute a landmark, almost a lighthouse on the lagoon border, and in addition to that, to signify the necessity of densifying the urban fabric in opposition with the foolish, criminal policy of the low-density low-rise sprawling suburbs that have practically eaten all the agricultural and countryside land of the Italian plains. Students were therefore asked to create the complexity of an urban district, with the aim to provide a real, feasible project for the re-development of such a



large site which lies in a key position not only to Mestre and Marghera but to Venice itself being at the border of its lagoon. Venice was not to be considered as a sort of romantic background, but as a real problematic [redacted] on skyscrapers, a number of lectures were given about the urban history of this unique city. Each group of students counted 3 or 4 participants of mixed nationalities in order to let different backgrounds blend together and force the use of the English language as the sole mean of communication. Each group had to produce a single A0 drawing plus a tridimensional model to be slot into the base provided by VAA.



A skyscraper on the Venice Lagoon : the project brief

Site surface: 30 hectares (300.000 sq.m.);

Tower: Max height 240 m - "footprint" area: max. 240 m. radius

- mixed use: dwellings (approx. 35.000 sq.m.)

- hotels and restaurants (approx. 30.000 sq.m.)

- offices, retails, services

- underground parking

- other buildings:

- education (academy of fashion and design/architecture)

- small scale residential (along the west boundary, facing Marghera garden-city)

- sports and leisure (small marina, recreational grounds)

- possible new infrastructures:

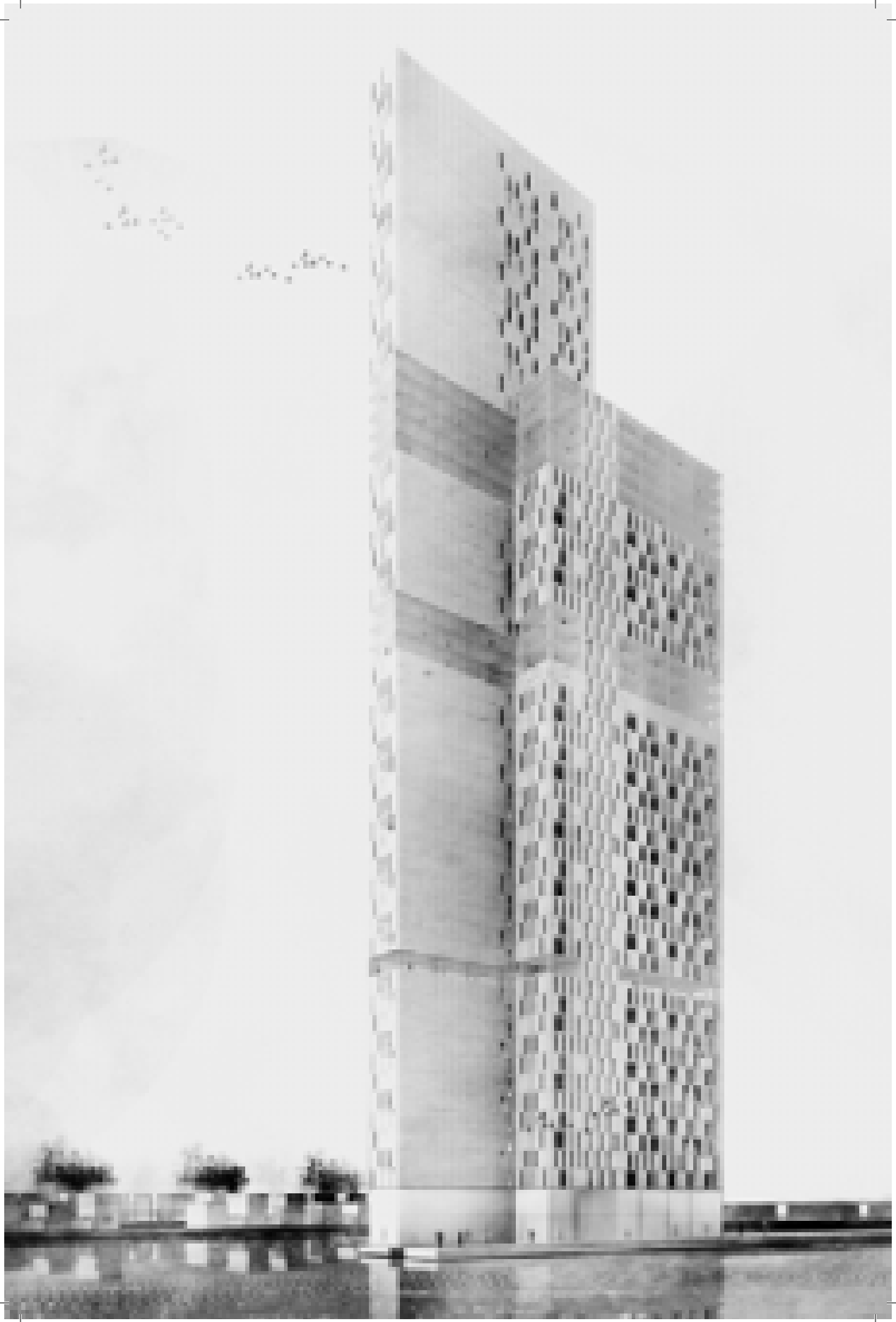
- suspended plaza, over the rail tracks and the new Mestre's high-speed trains railway station, bridging Mestre on the north and Marghera on the south, with relevant new roads -parkland: along the channel, roughly in the south part of the site

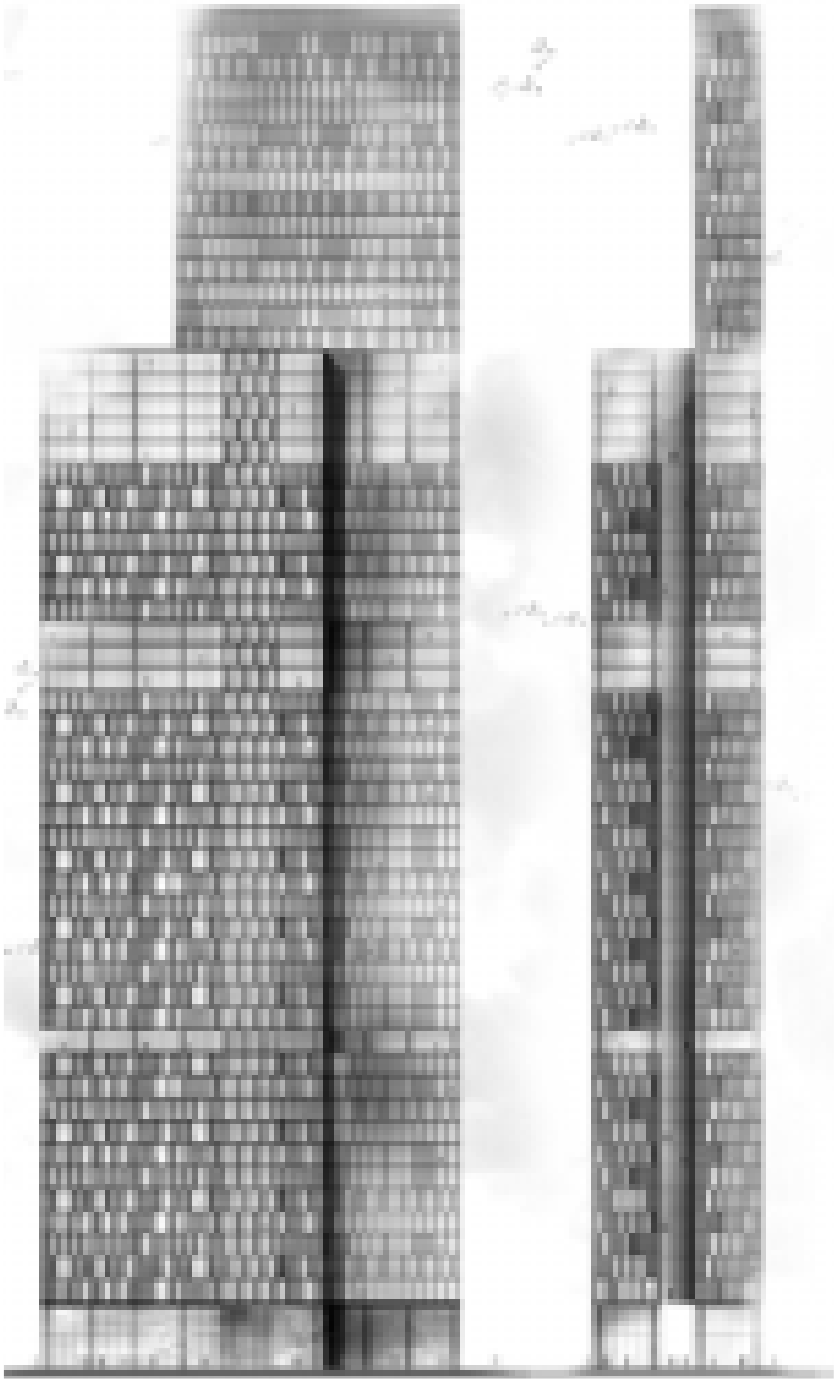
01

Selected project

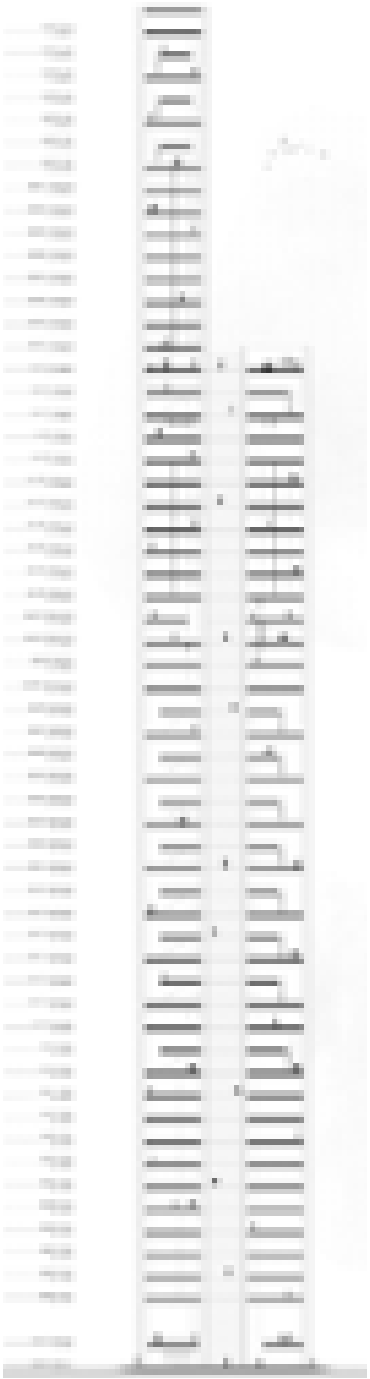
Eros Conte + Alessandra Trentin + Andrea Sartor

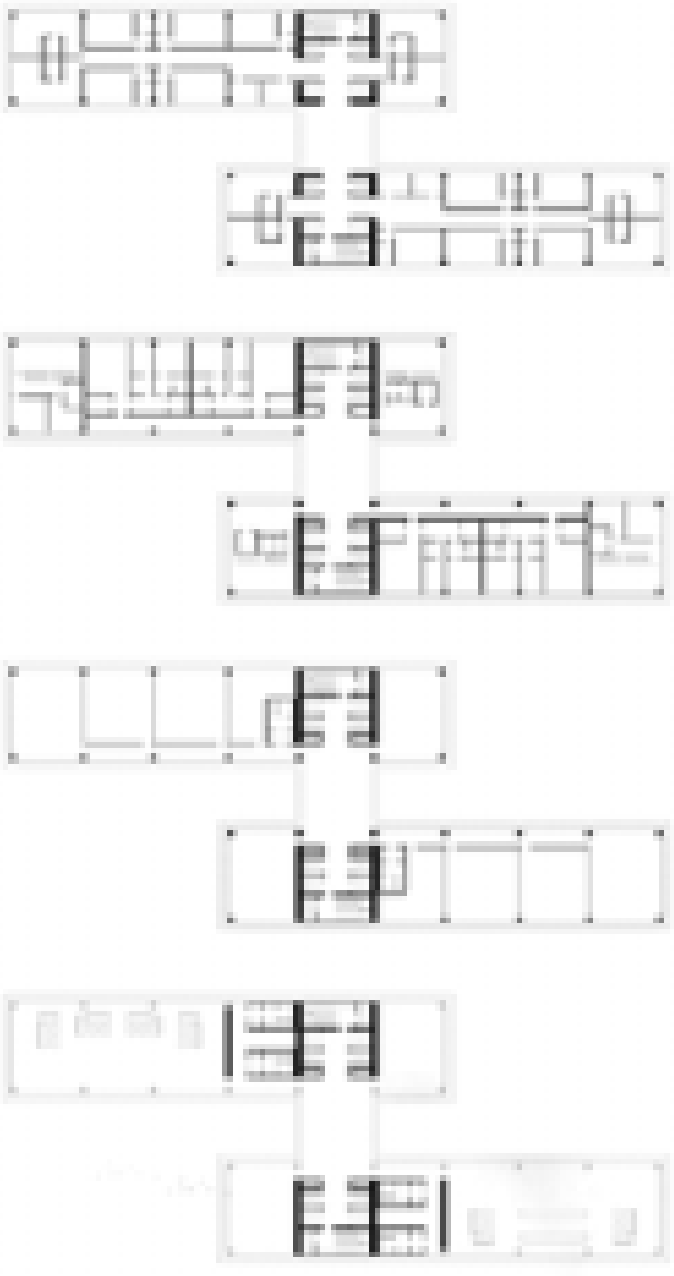
This projects and the project number 12 stem from a similar initial layout of the site and a joint idea of the tower that evolved in two different variations of the same idea. Both projects are very elegant and delicate and create a low-density area concentrating all the built volumes in two high rise buildings. A strip of low rise units create an urban shopping road, alternated with trees and grass strips.Both "the Comb" and "the Thick" buildings enhance their verticality creating a sober figure that marks the skyline of the city.



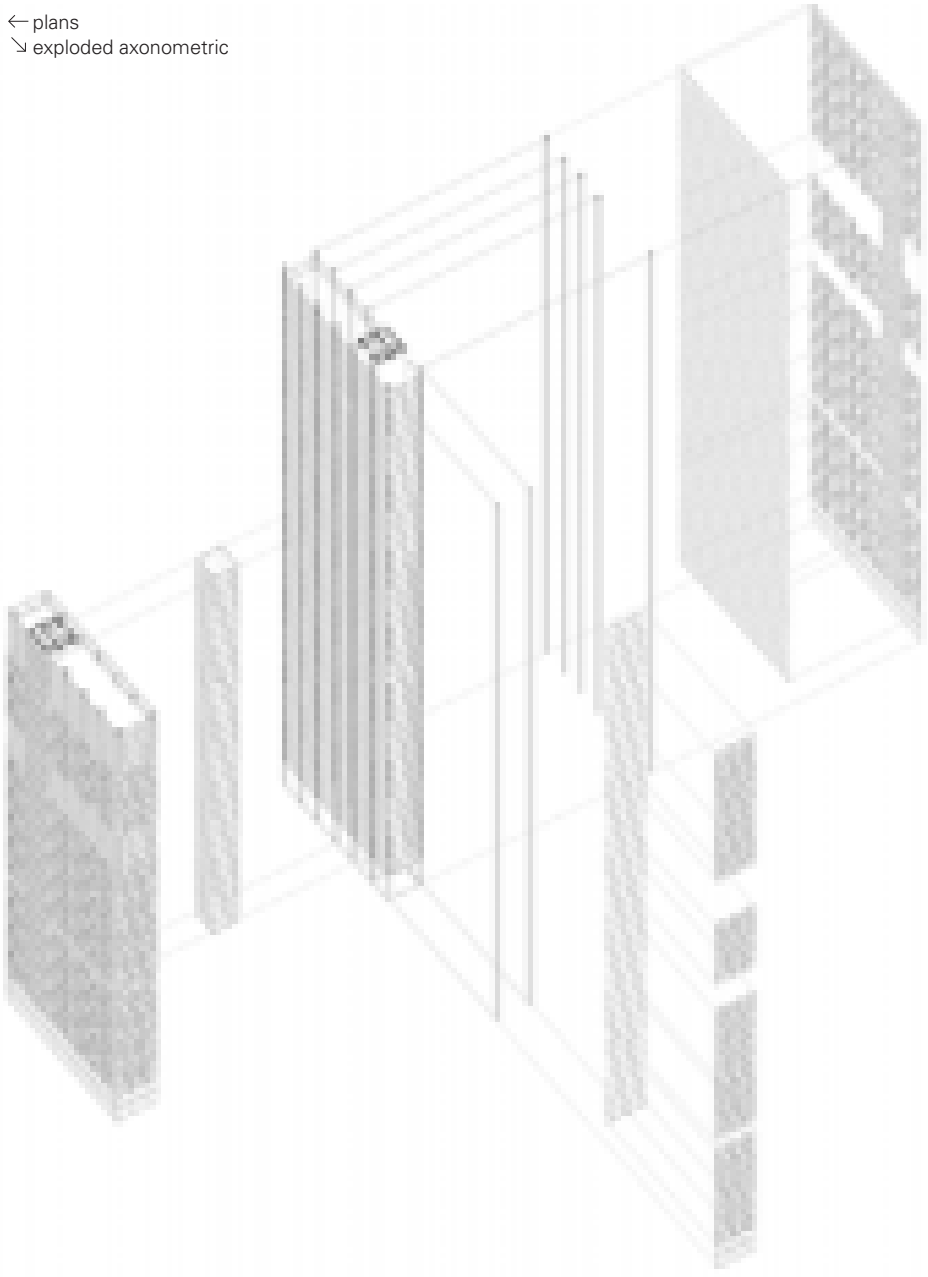


↑ use of the ground
← elevations
↓ view of the model
→ section





← plans
↘ exploded axonometric

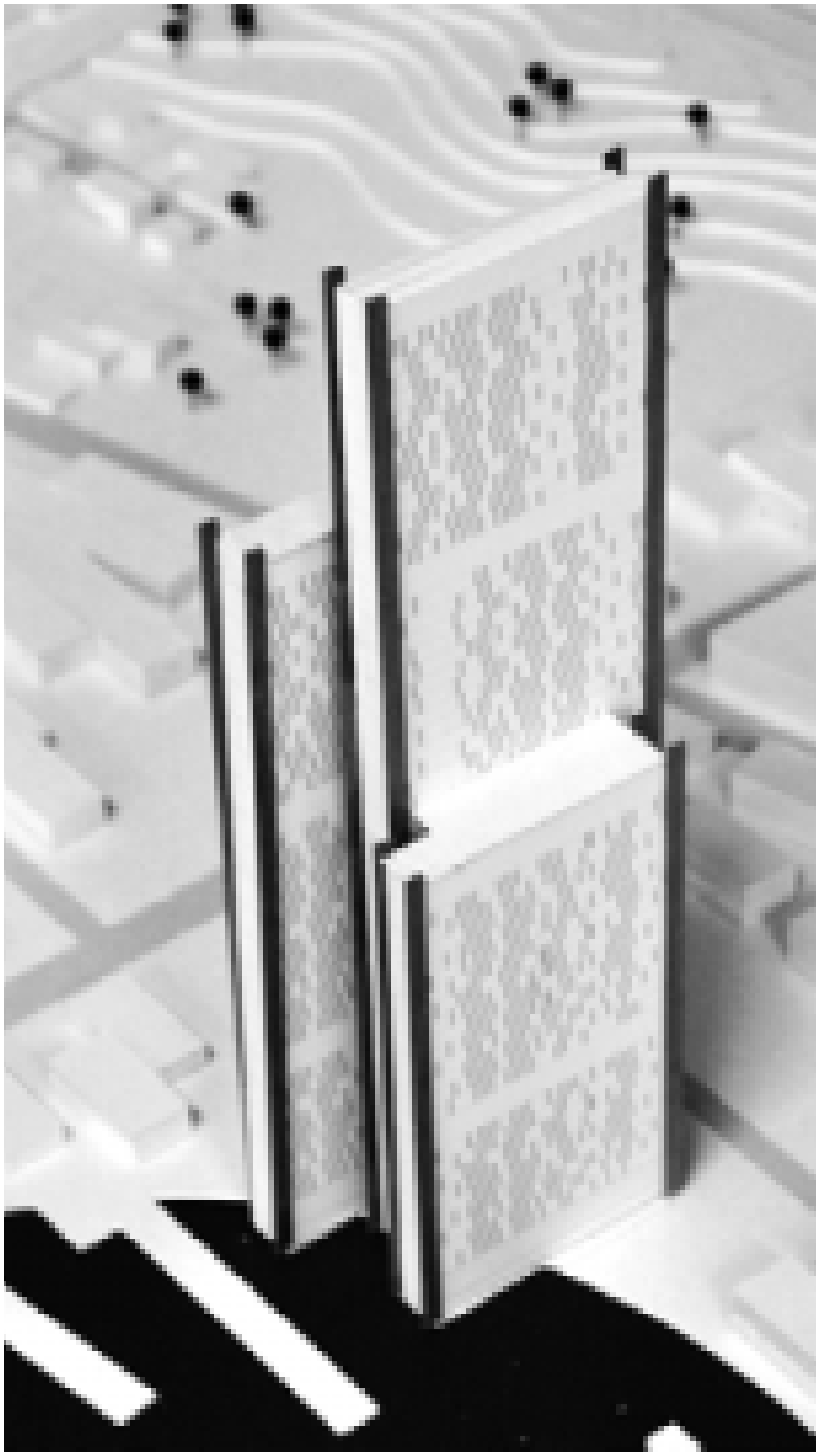


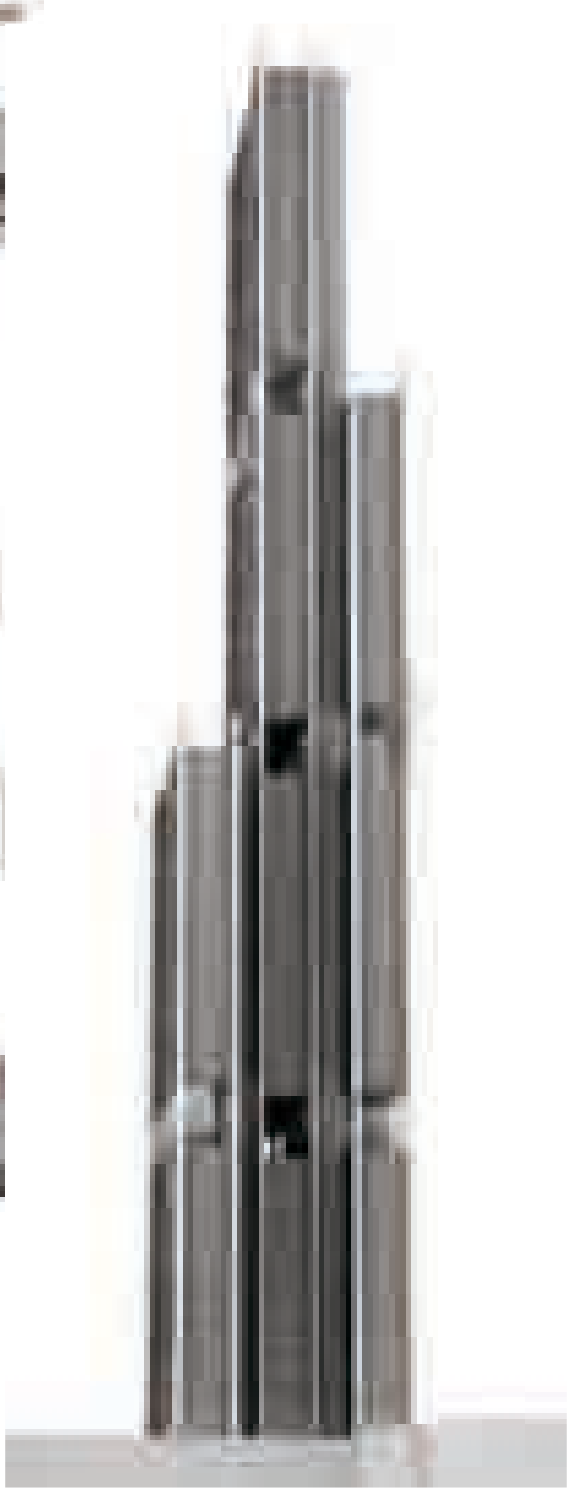
02

Selected project

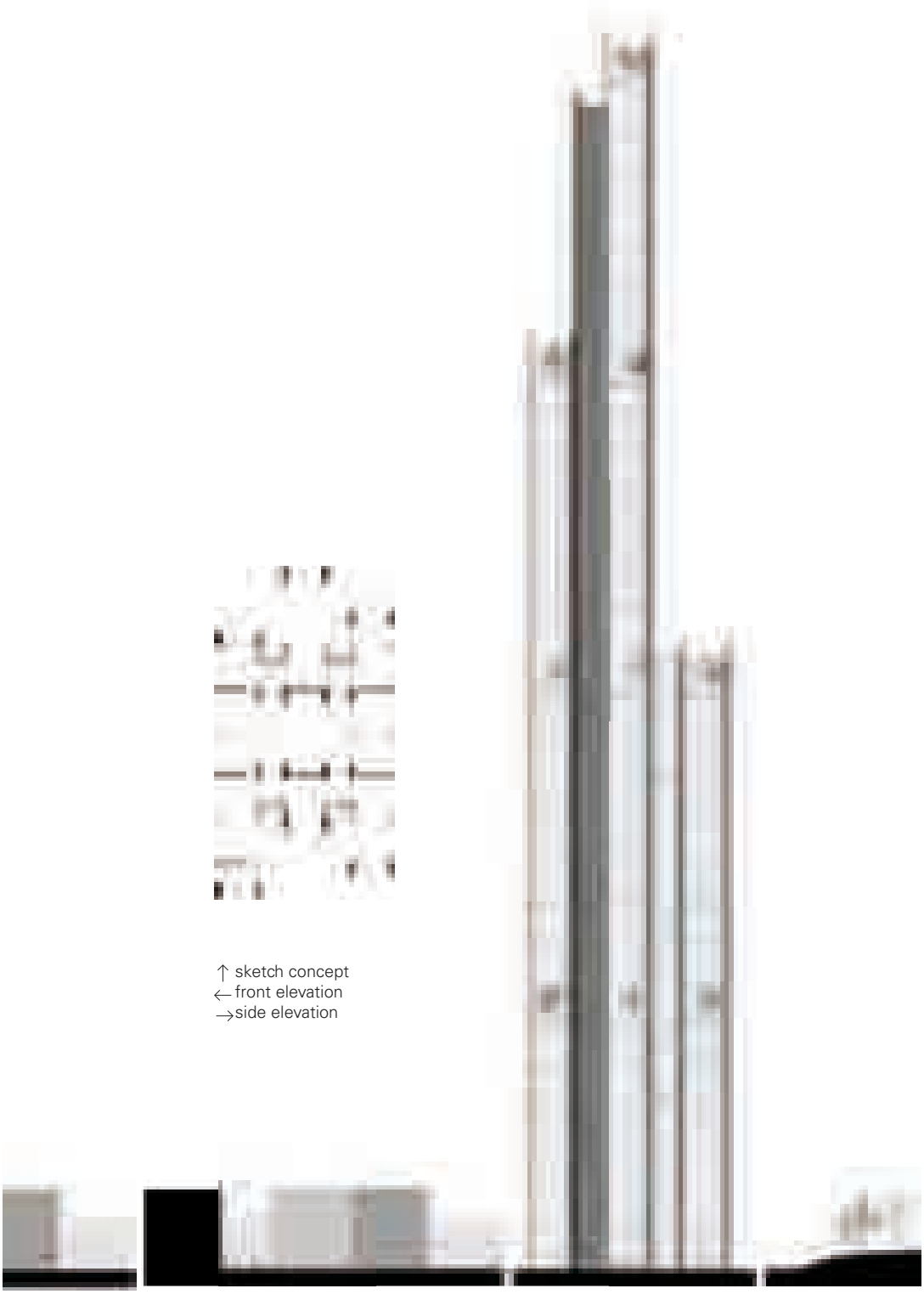
Chiara Facchinello + Veronica Feltre + Tim Magner

The soil that would be removed to enlarge the marina has been used on-site for the creation of an artificial hill that divides the project area from the noisy infrastructures (railroad and freeway) that form its northern boundary. The focal point of the master plan is an iconic tall building that stems from the ground with majesty. The three vertical blades that constitute its mass are oriented north through south, creating an unexpected movement in comparison with the east-west direction of all the other buildings of the site.





↑ urban axis
urban situation
functional scheme
← plans
↗ view of the side



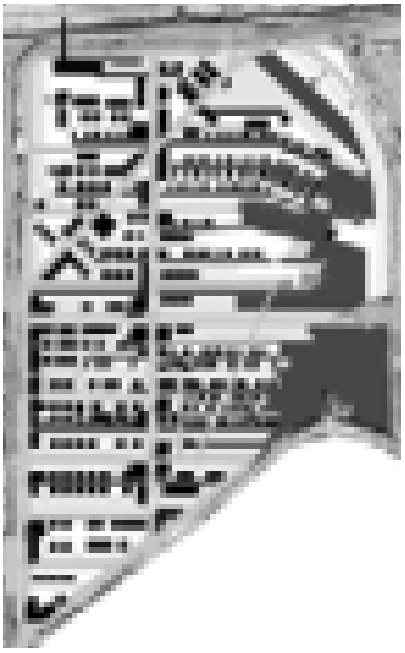
↑ sketch concept
← front elevation
→ side elevation

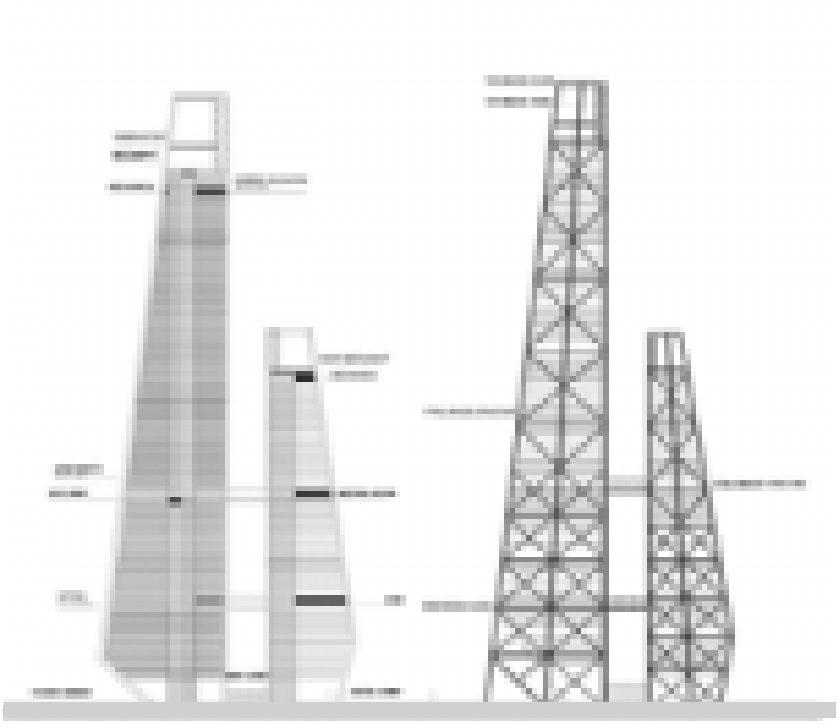
03

Selected project

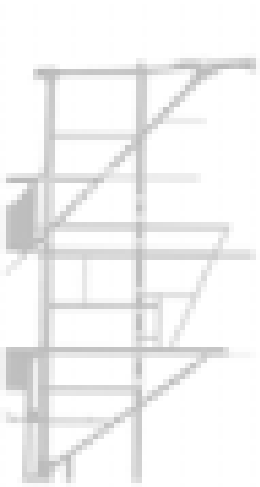
Matteo Giammartini + Natalia Gutierrez + Simone Luccichenti + Luca Malvasi

The idea of this group for the re-development of the site is the creation of a bond between the land and the lagoon. The whole site has been conceived as a reproposition of a typical Venetian urban pattern with long and narrow islands bordered by channels as well as narrow pedestrian paths, gently sloping down towards the lagoon, in this way allowing the line between soil and water change according to the tides.The focal point of the site is a sort of un-material square, bordered by landmark buildings but partially filled with water thus mimicking the complexity of spaces that characterize the historic city center of Venice. The base of the taller tower has been cut, to create a dramatic space overhung on the water. The gateway to the hotel is from the water, as one can find in many historic buildings of Venice.

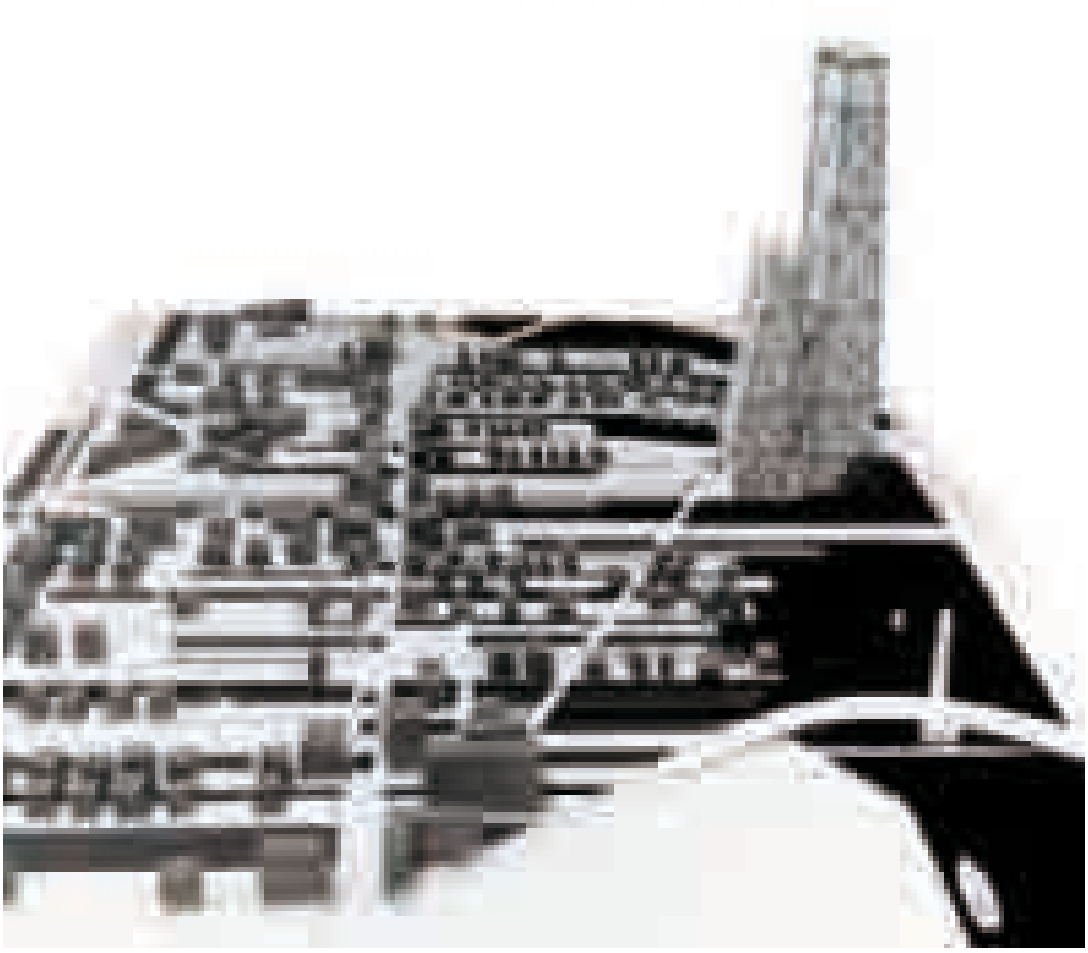




← elevations
↑ use of the ground



← elevations
↑ use of the ground
↓ view of the model
→section

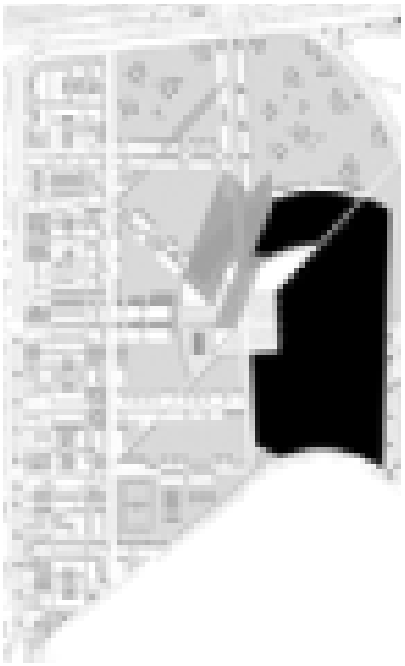


04

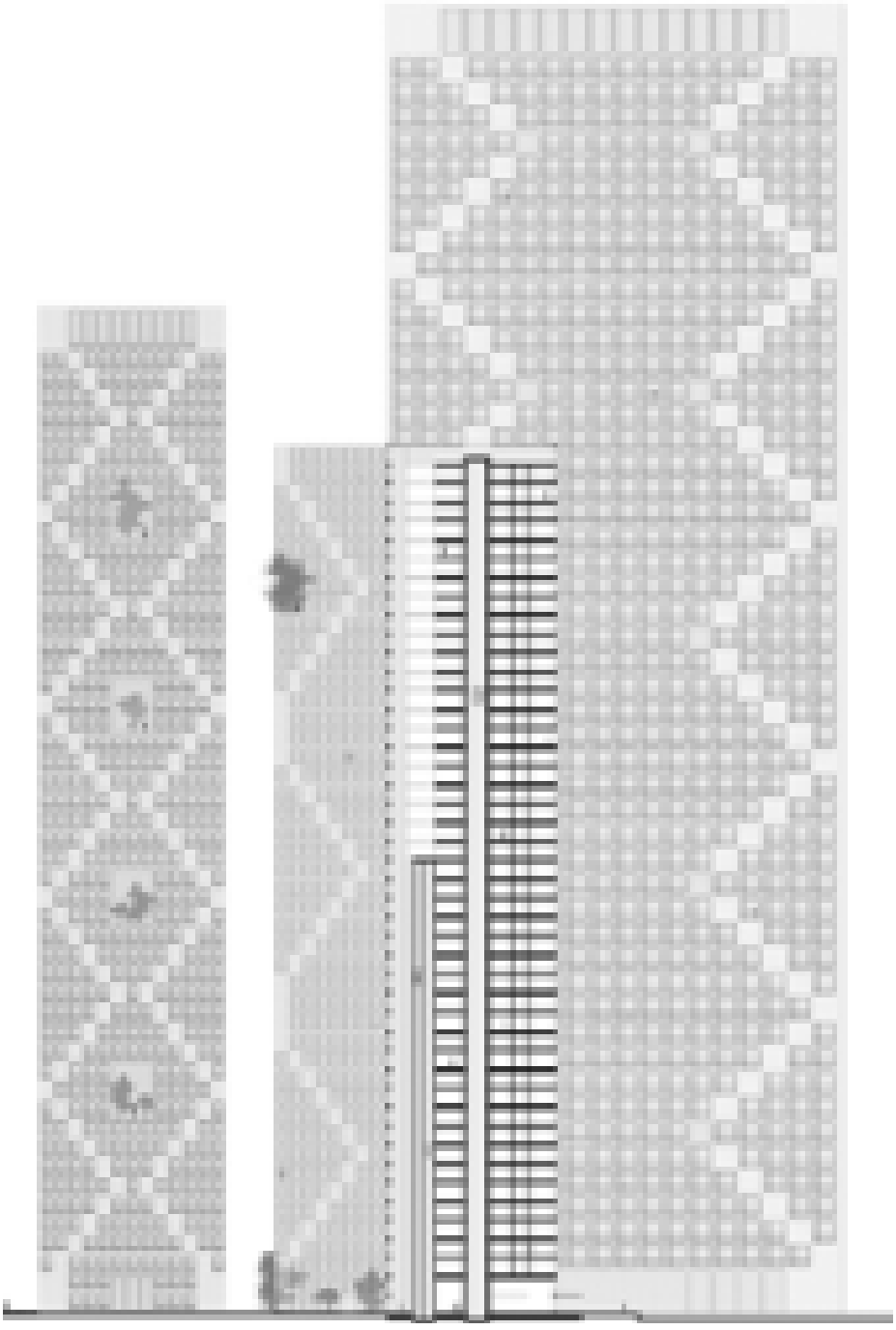
Selected project

Alexander Bibbo + Elisa Bortolozzo + Enrico Marzaro + Elisa Toscano

Both the site and the tall buildings are influenced by a powerful search for geometry and order. A strip of low rise buildings creates a connection with the city of Marghera, while most of the site is occupied by an urban park with a large marina. The center of the development is occupied by three high-rise buildings whose volume are shaped by the directions of the road axis. Each building hosts a different function – residences, offices, hotel – and they are characterized by an external load bearing structural concrete skin. Particular attention in this project was dedicated to the arrangement of the service core, so as to provide the most efficient use of the built space.



← plans
↙ ground level
↓ elevations and section

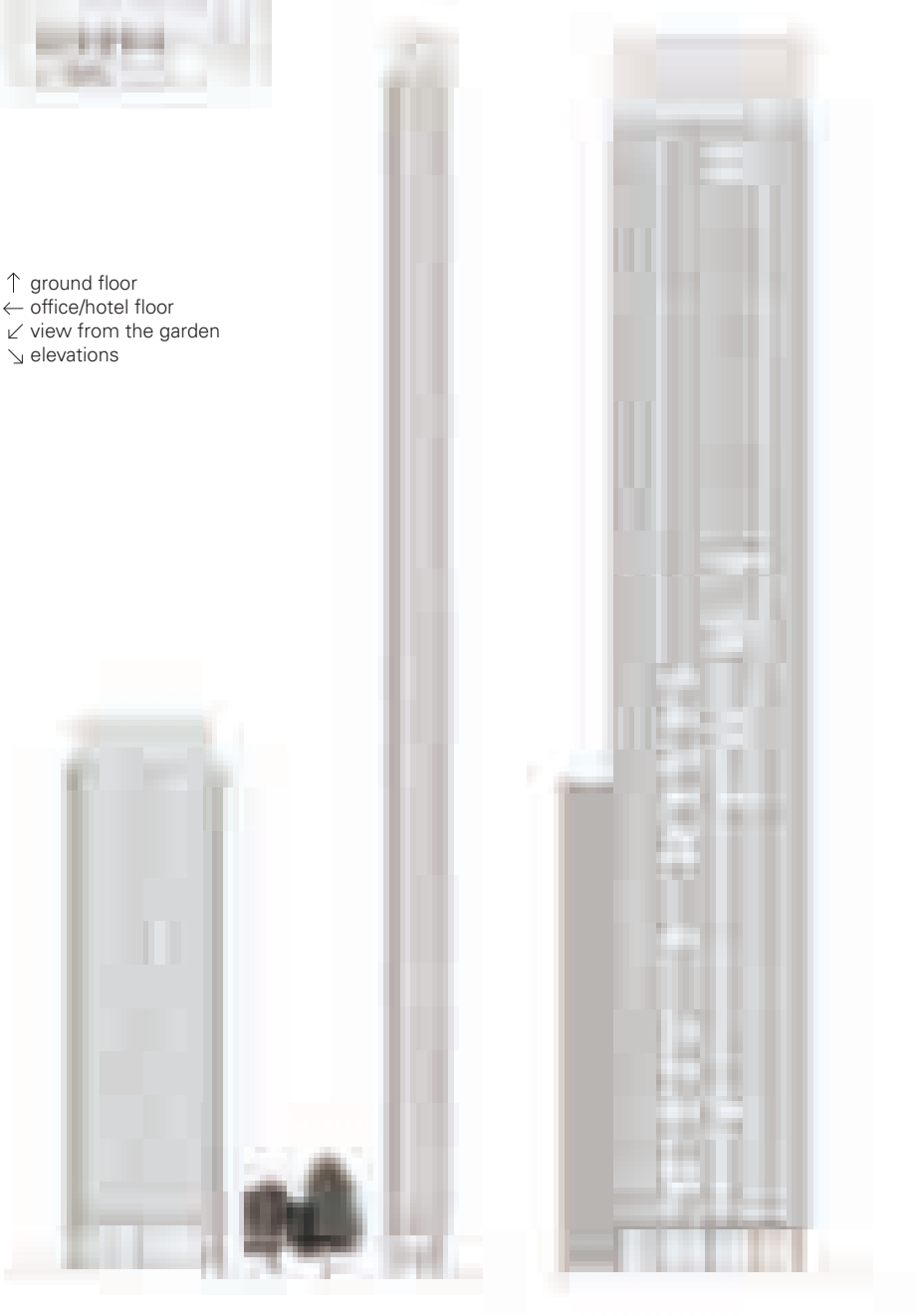


05

Roberta Brucato + Lucia Perissinotto + Ludovico Pevere

The masterplan of this project creates an urban park characterized by low density units that try to recreate the original aspect of the old city of Marghera. The high rise buildings stands as a very elegant thin blade in the middle of the park, reinforcing the horizontal axis of the streets and providing a beautiful view from the park and to the park.

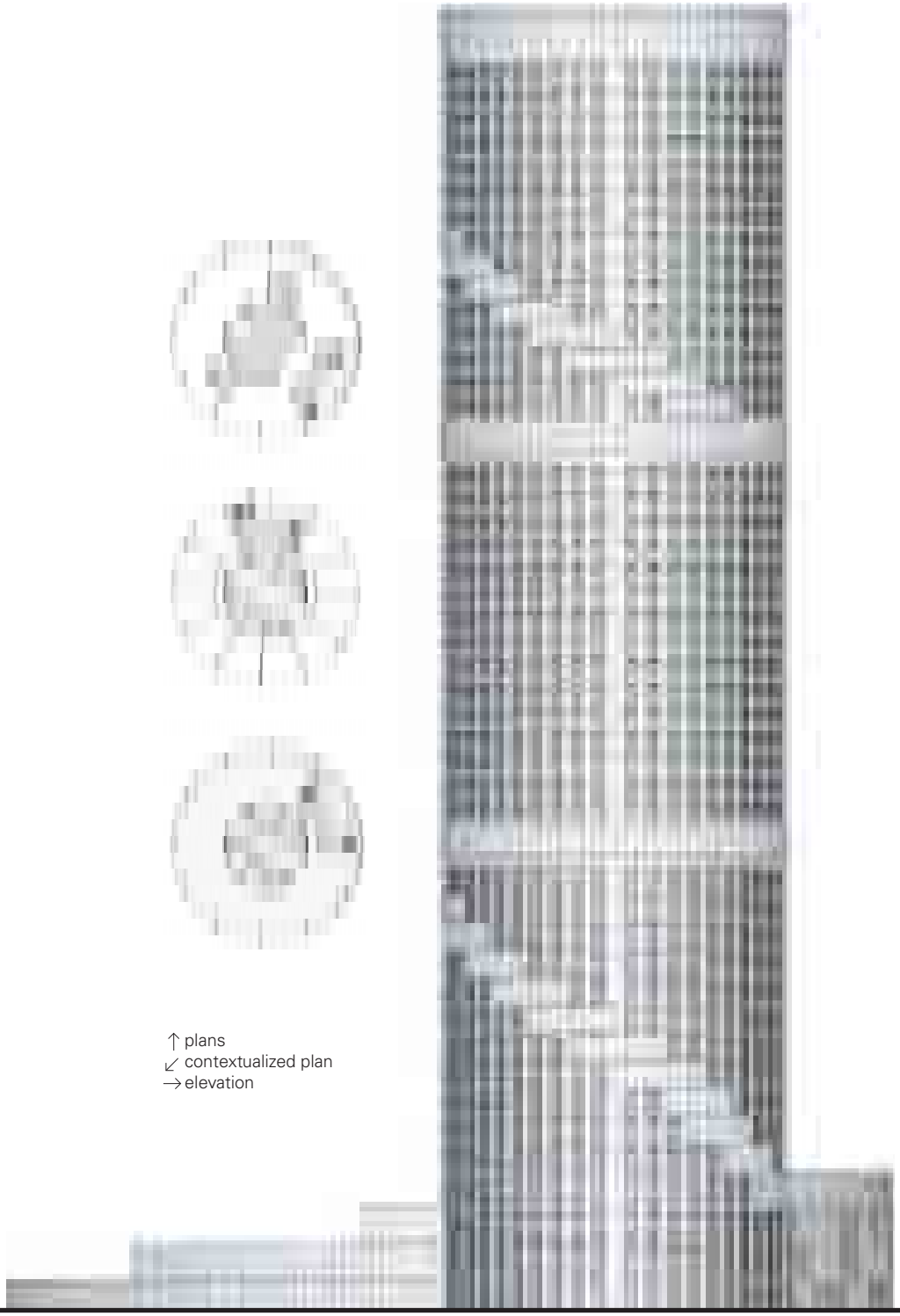
↑ ground floor
← office/hotel floor
↙ view from the garden
↘ elevations



06

Chuyu Qui + Giada Genovino + Lorena Todaro

The idea of the masterplan is the recreation of an urban park, characterized by a simple spiralling geometric principle that drives the attention to the iconic circular tower that stands on its center, bordering the lagoon and the built district.The solidity of the building is reinforced by the choice of an external concrete structural system and by the rigorous geometry of the windows cut into its hard surface.

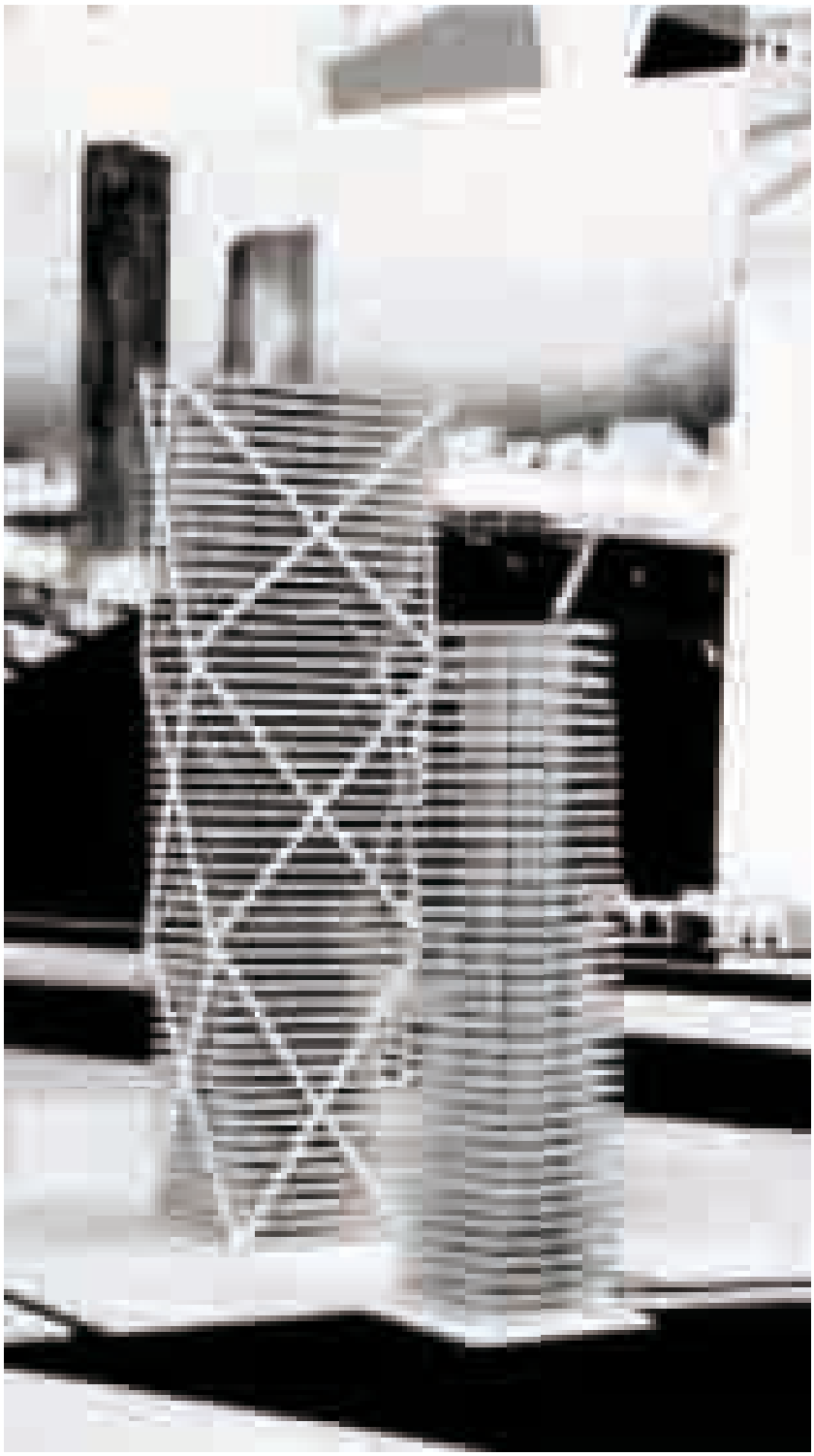


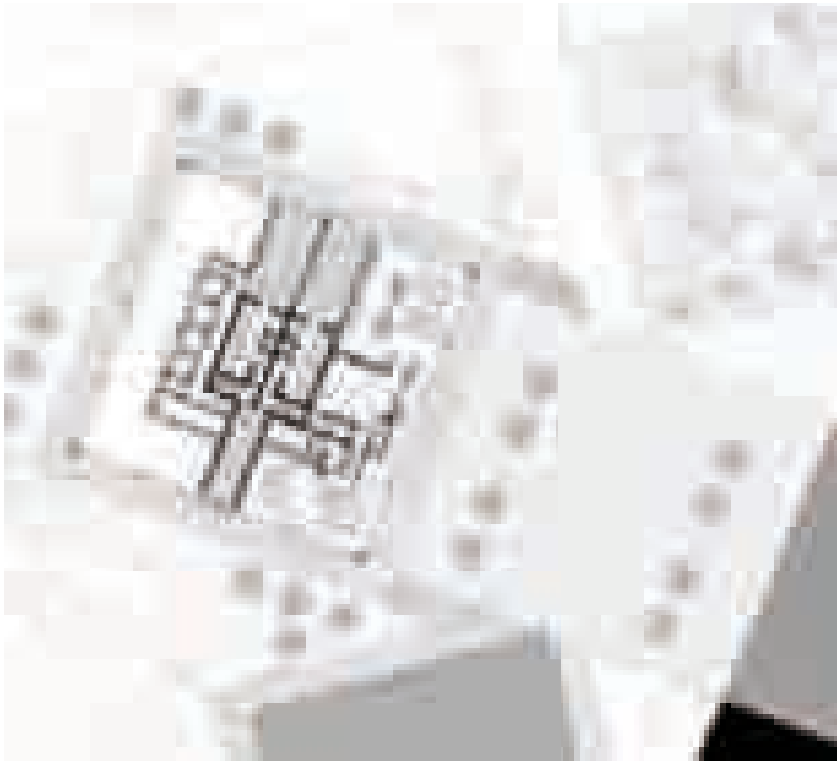
↑ plans
↙ contextualized plan
→ elevation

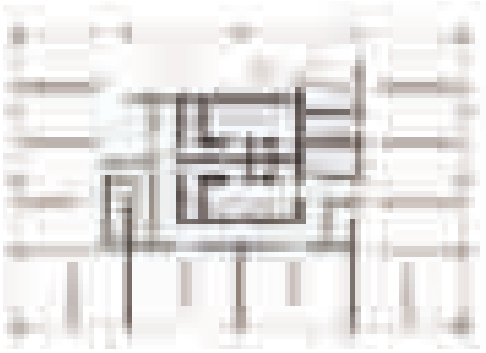
07

[illegible]

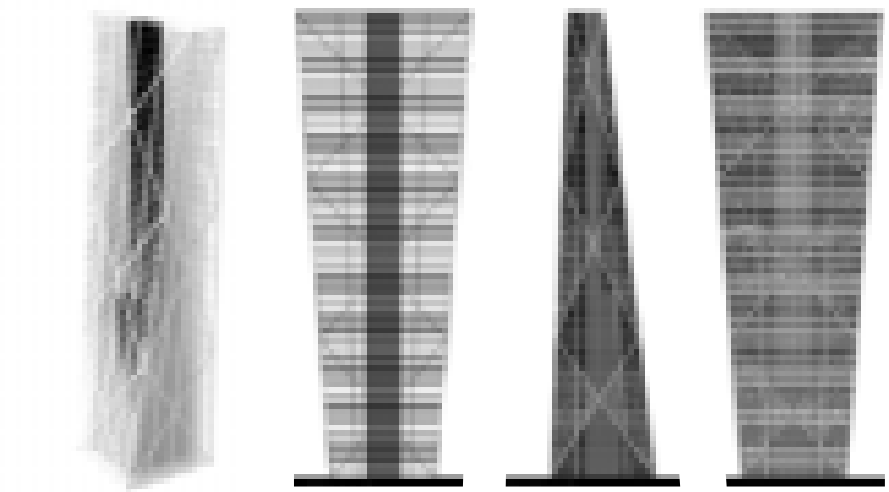
The site layout integrates low rise buildings in a green district regularly developed on a grid with a central public space and a plaza, where two towers border the marina.The higher tower's goal is to maximize the view toward Venice and its lagoon. Starting from a squared foot print the tower tapers up so as to offer a very large front in the south-east direction at the top floors, where no obstacles obstruct the view on the historic city.







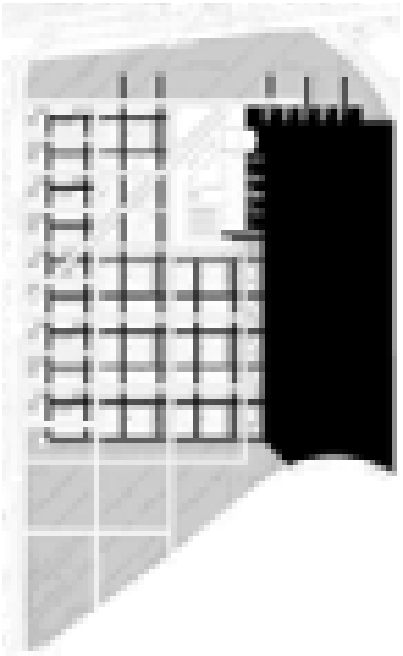
↖ ground floor
↙ aerial view
↘ structure
section
elevations
↗ plans

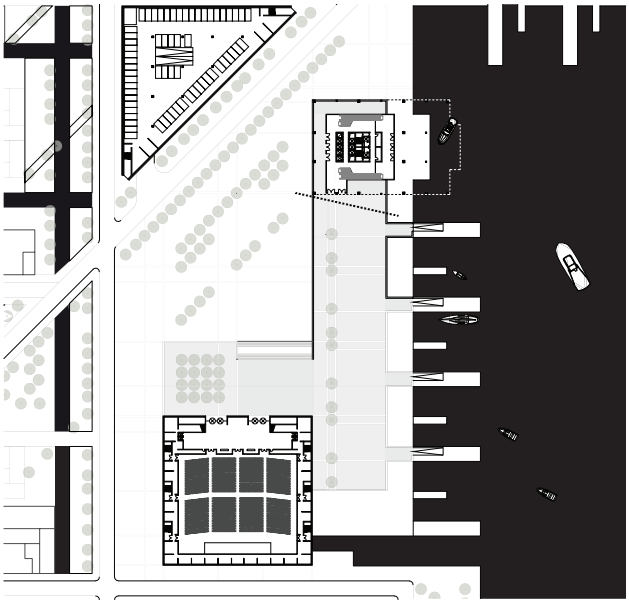


08

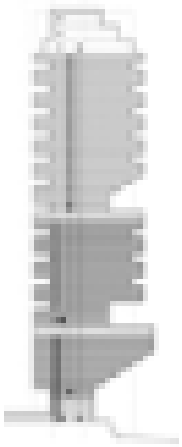
Melissa Cappozzo + Guido Pantani + Marina Tenace

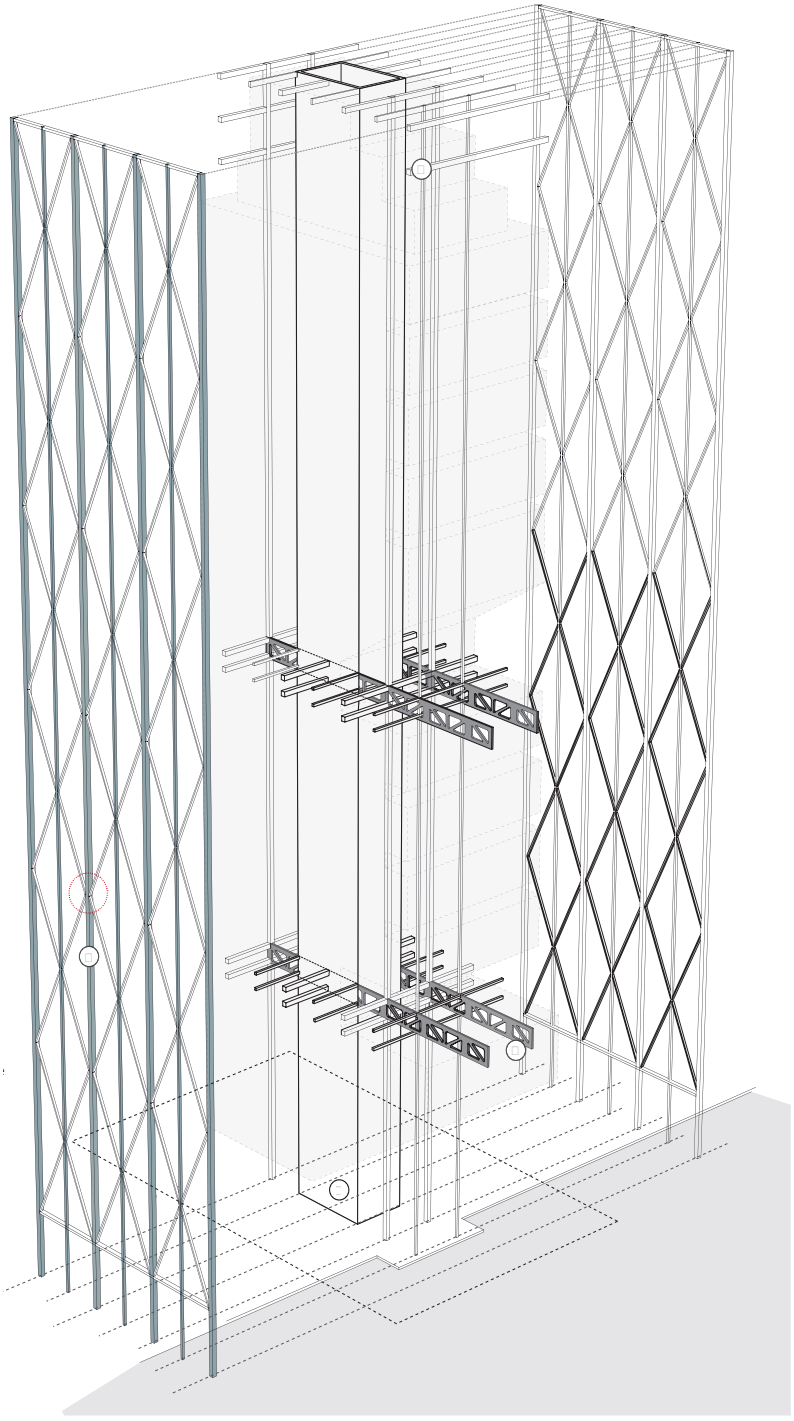
The whole site has been treated as a new garden city, that differs remarkably from the old one in Marghera, despite the volume of the residential buildings. The masterplan has been developed with a very strong geometric pattern and it is separated from the city on the north and the south by a large public garden.The main tower is treated with the same rigour: an independent structure supports the "trays" where the functions of the buildings are located. The south side, a shading element protects the building from the direct solar radiation, creating hidden terraces that allow a view on the lagoon also for the apartments facing on the less favourable direction.

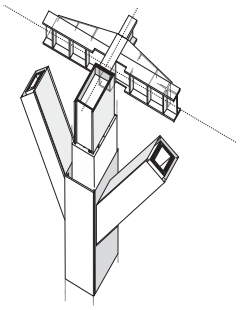




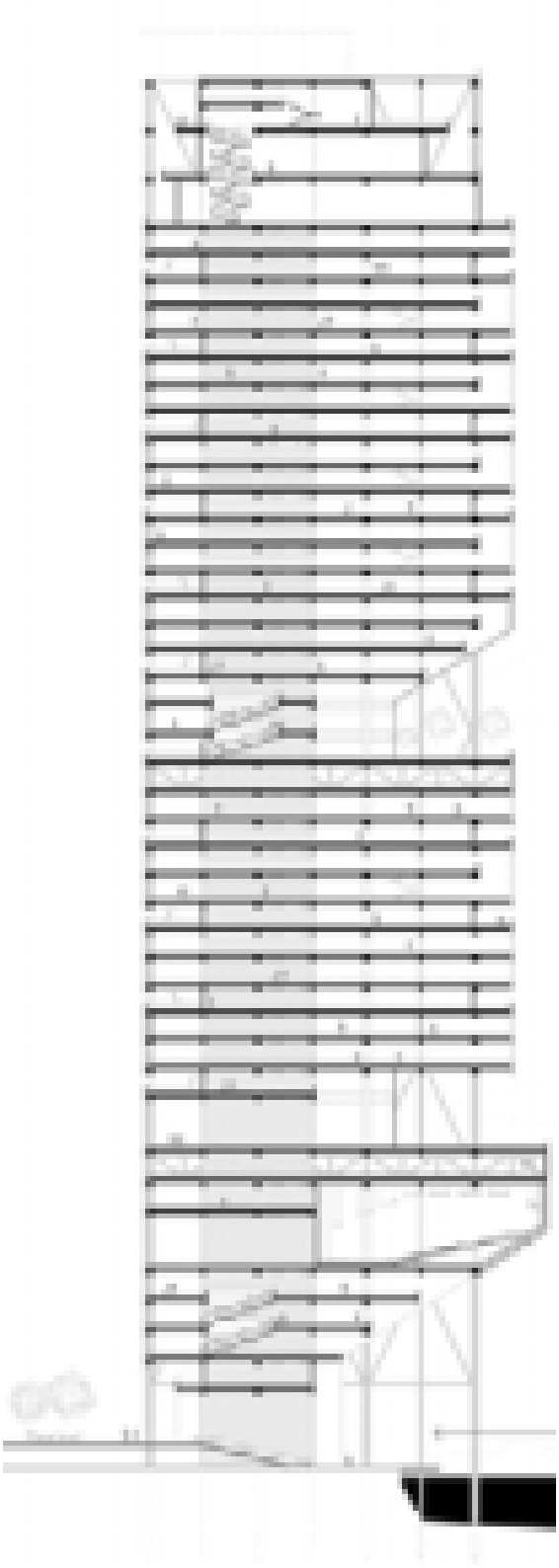
↖ office / hotel plan
↓ section
→ model
↗ ground floor







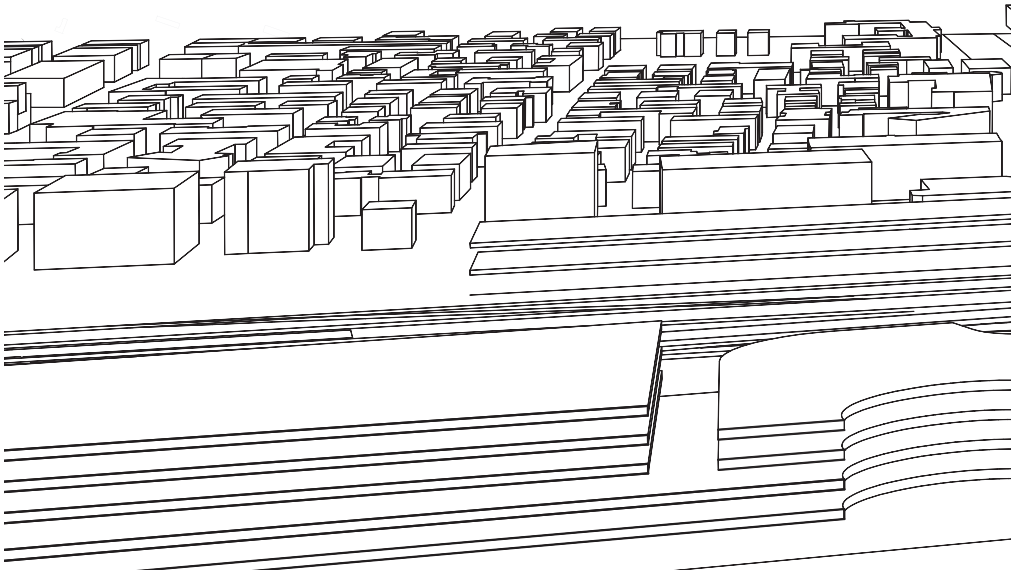
↑ detail of connections
↖ technological
axonometry
→section

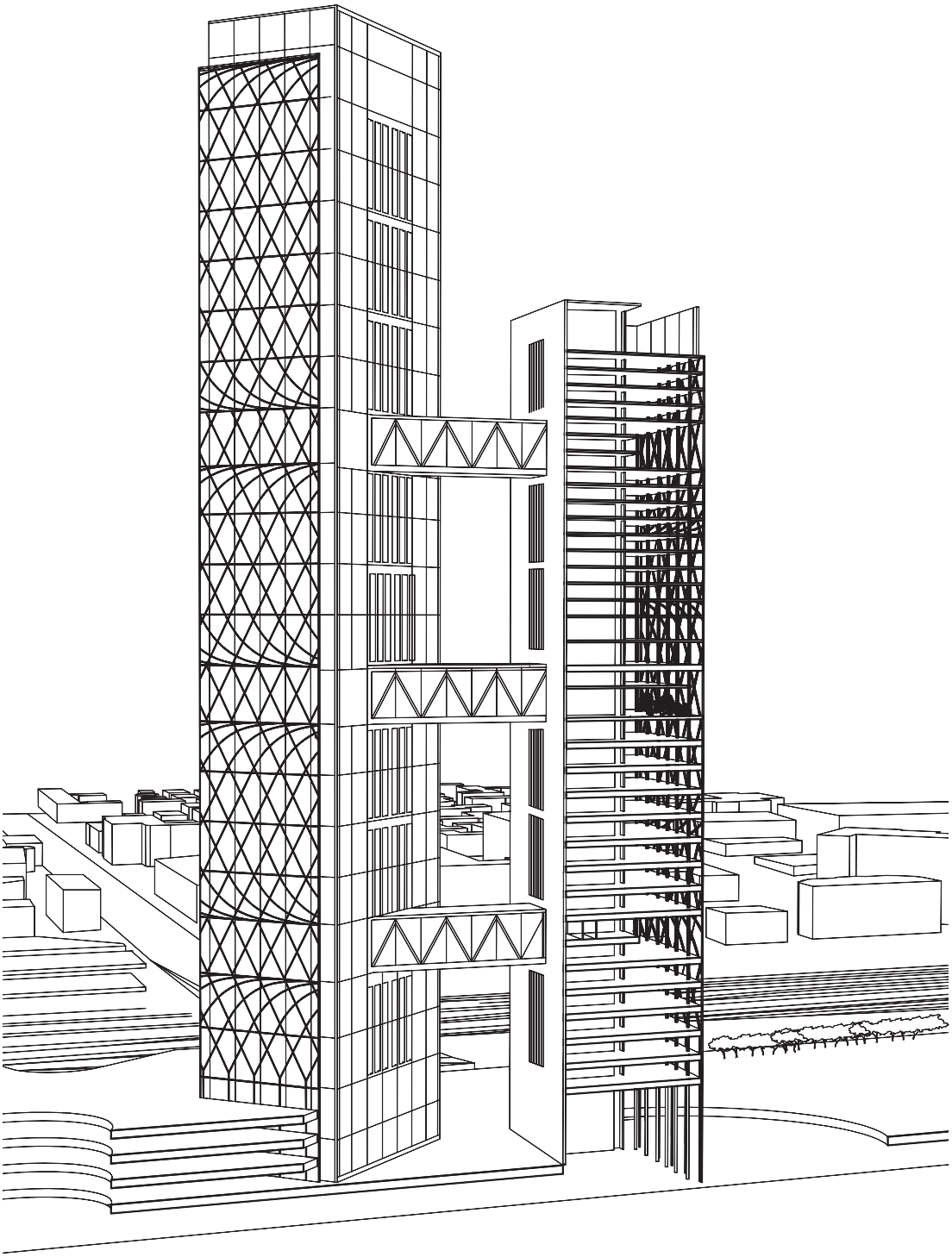


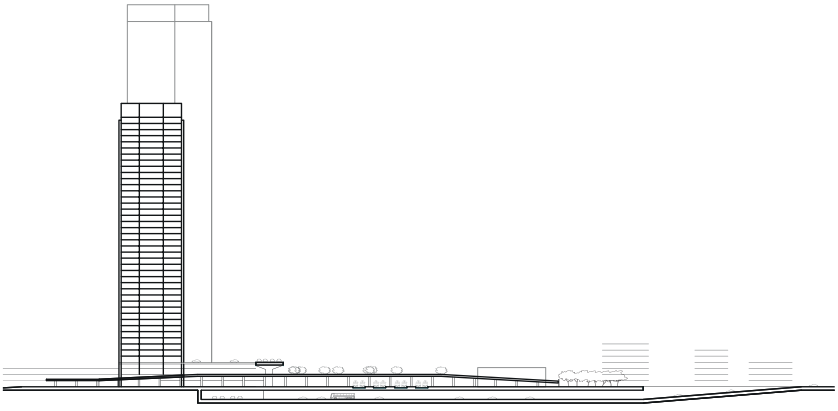
09

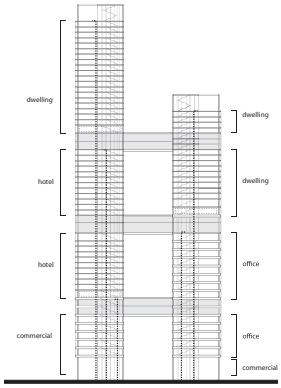
Jola Daberdaku + Emanuele Paladin + Samie Kayani + Giuseppe Stella

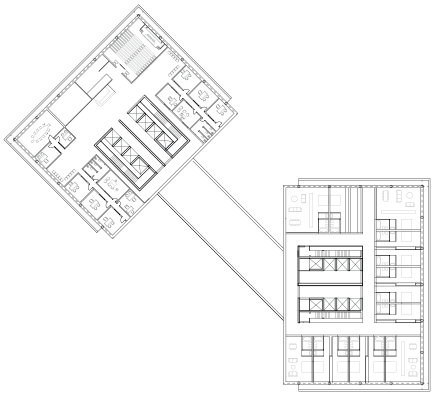
The industrial pre-existing canal has been enlarged to form a vast marina. The low-rise informal architecture of the garden city of Marghera has been replicated in the new development,.The two tall buildings that form the focal point of the development have been located on the conjuction of the two main road axes of Mestre and Marghera, so as to create a visual connection between the two cities actually divided by the railway tracks. The physical barrier of the freeway has been enriched by means of a linear park which also hides it from sight. The two towers are actually functionally connected by three skybridges, so as to create public amenities at height, marked by small internal gardens and triple height voids.



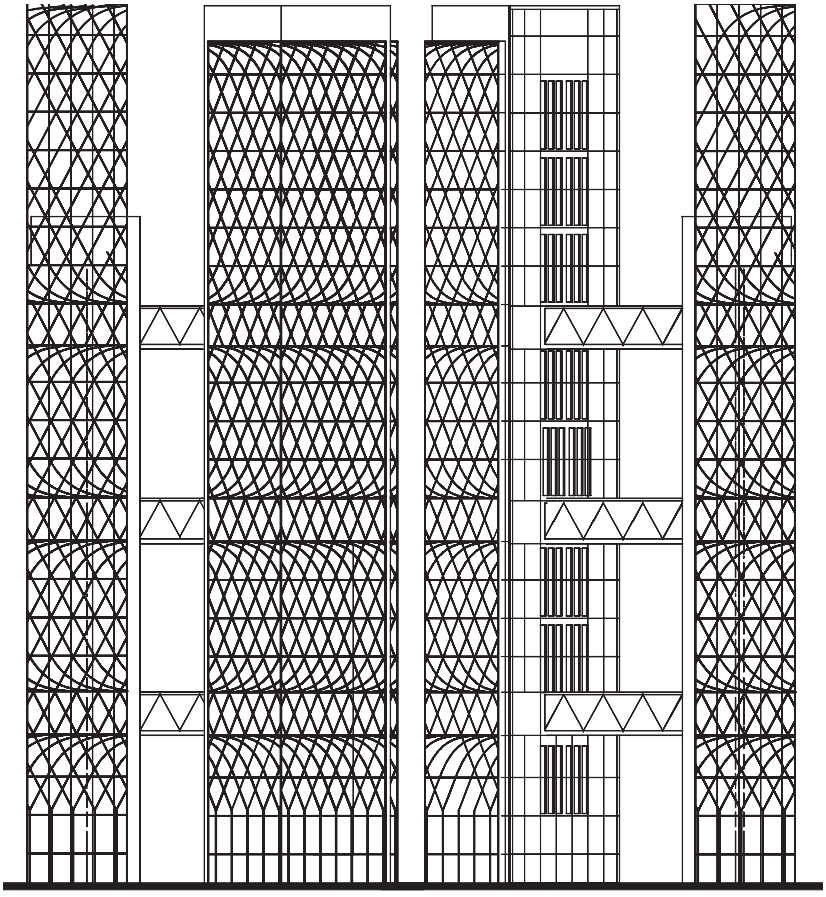








↑ section with common spaces
↖ urban section
← urban perspective
↘ section and elevations
↗ common spaces level



10

Chiara De Gennaro + Patrick Lim + Sara Maschietto + Elena Squizzato

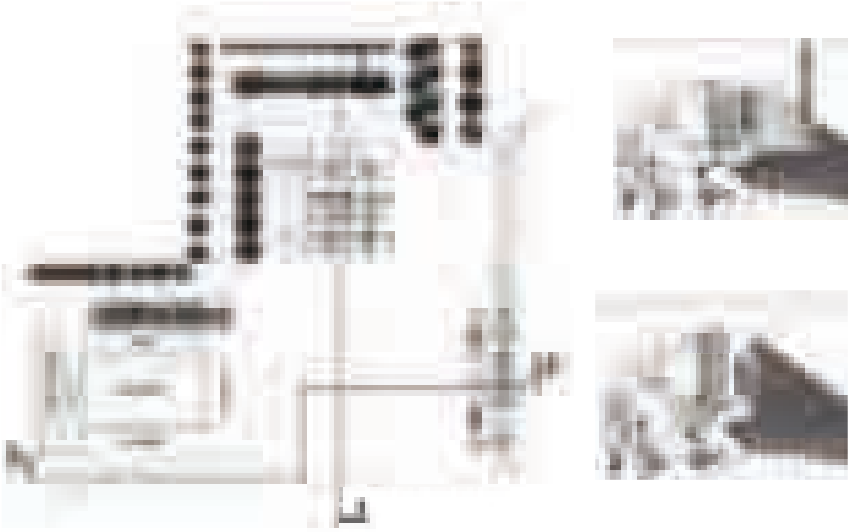
The focal point of the master plan is the island created on the eastern part of the site: it provides a peaceful environment for the community living on the garden city of Marghera, that has been expanded on the west side of the site to mediate between the low rise existing buildings and the tall towers.
The two tall buildings are facing such island on the lower levels, so as to benefit from the view and provide a direct access to the park. As they grow up in the sky, the east and west facades turn clockwise, so as to benefit from the view on the lagoon that is visible from a certain height. The rotation is not intended as a matter of fashion, but rather as a response to the site geometry.

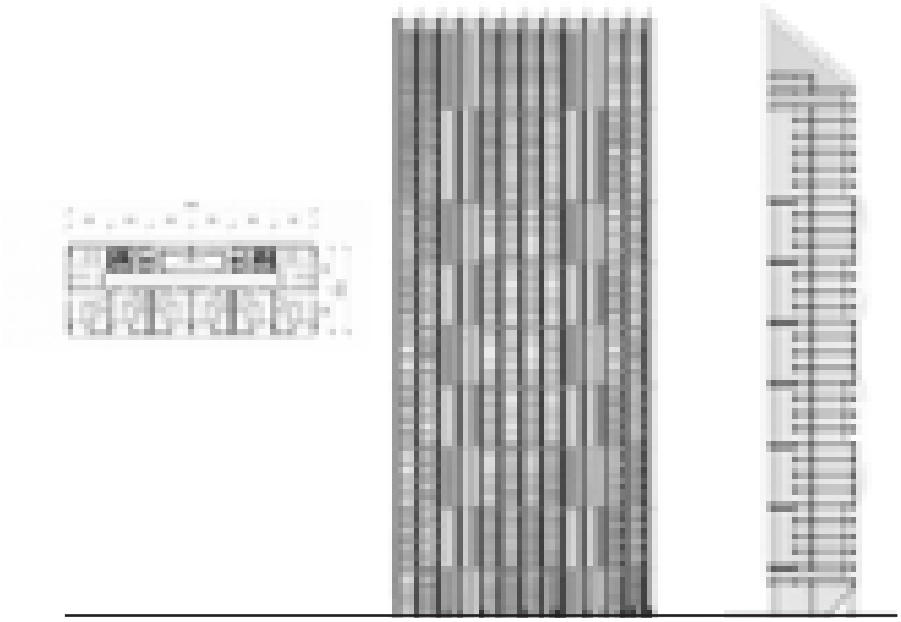
↑ view from the water
← contextualized plan

11

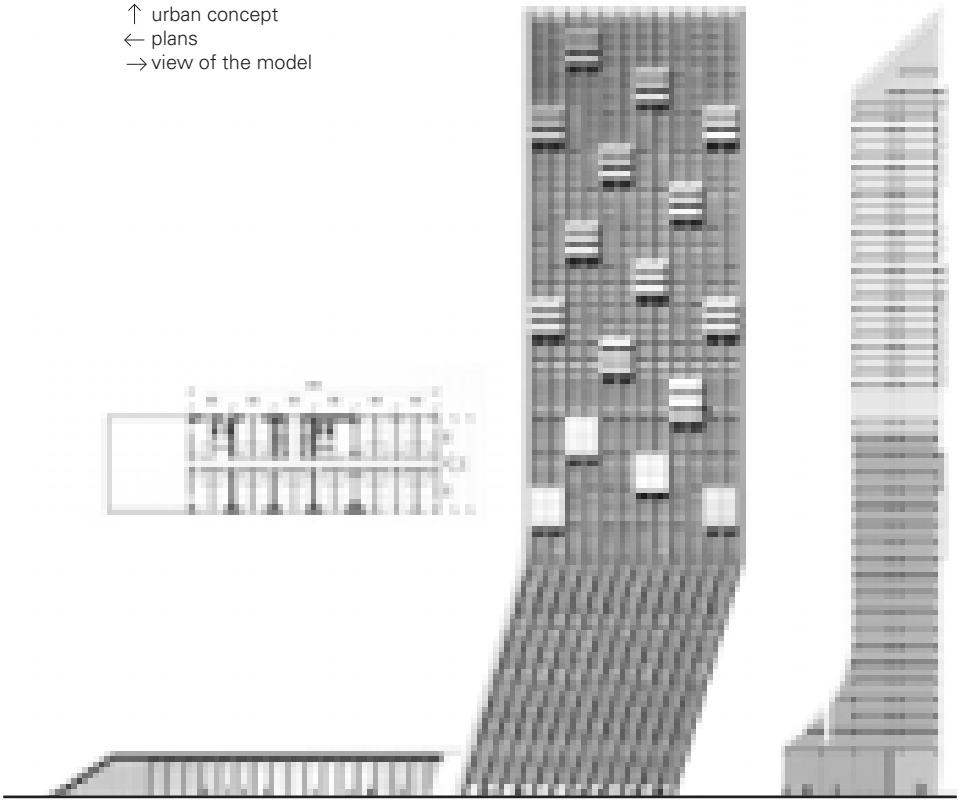
Matia Cester + Michele De Zotti + Willie Yogatama

The existing abandoned industrial site has been transformed by this group into a residential area that aims to re-establish the urban connection between Mestre and Marghera, thanks to the re-creation and the reinforcement of the existing urban road axes.The tower is bended so as to invite the passer-by into the plaza. Though its volume is characterized by a complex geometry, particular care was paid so as to create a simple structure, limiting the span of the cantilevered part; in fact a key role is played by the design of the facade that reinforces the movement of the tower, without affecting negatively its functioning and its structural scheme.





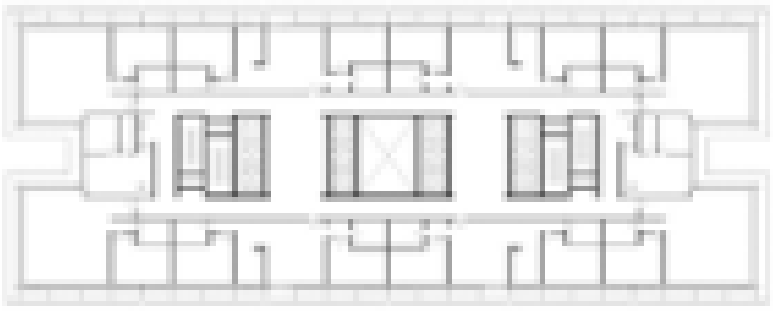
↑ urban concept
← plans
→ view of the model

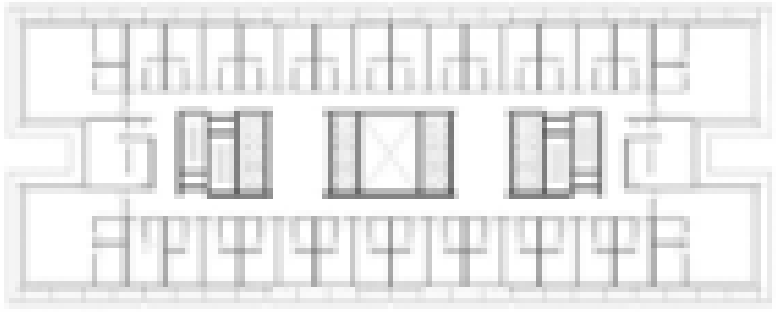


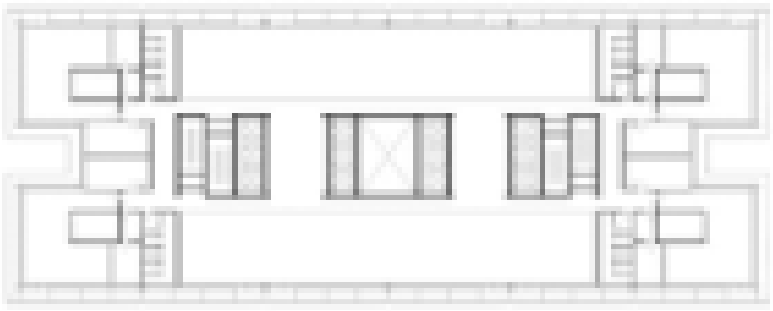
12

Shivani Mathur + Marco Salvador + Mohamed Ebrahimi + Alessandro Chiarcossi

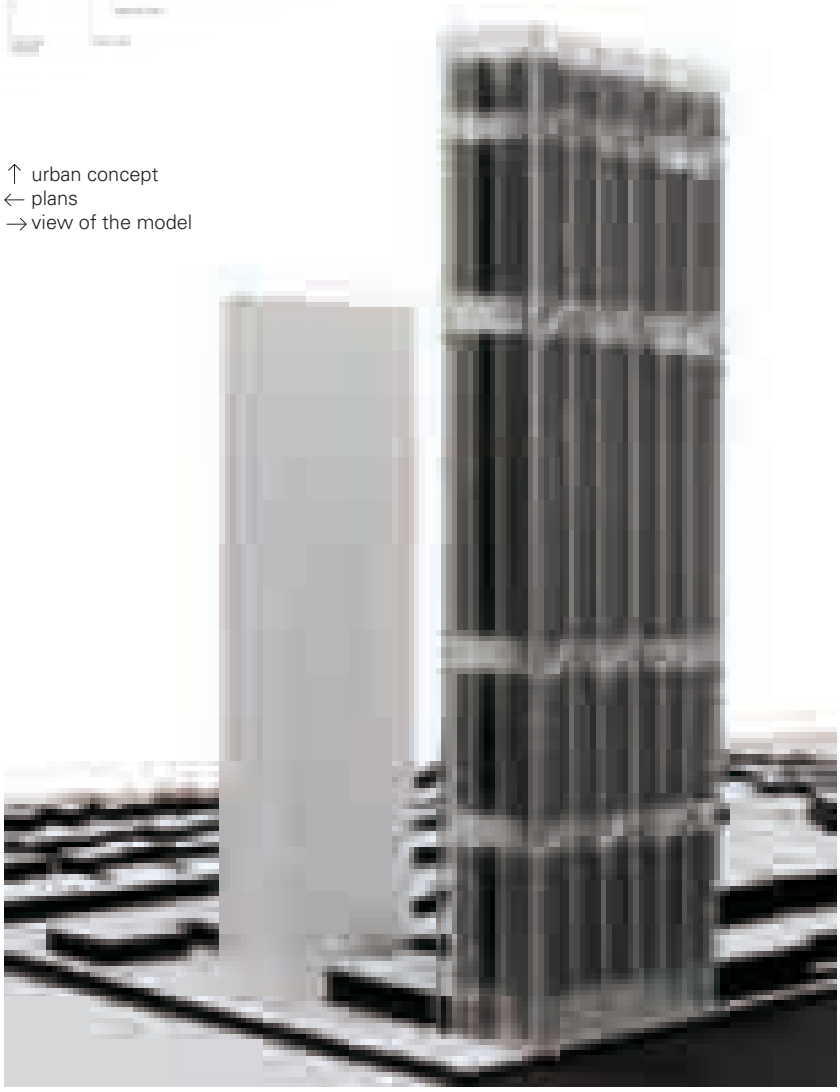
This projects and the prject number 1 stem from a similar initial layout of the site and a joint idea of the tower that evolved in two different variations of the same idea. Both projects are very elegant and delicate and create a low-density area concentrating all the built volumes in two high rise buildings. A strip of low rise units create an urban shopping road, alternated with trees and grass strips. Both "the Comb" and "the Thick" buildings enhance their verticality creating a sober figure that marks the skyline of the city.

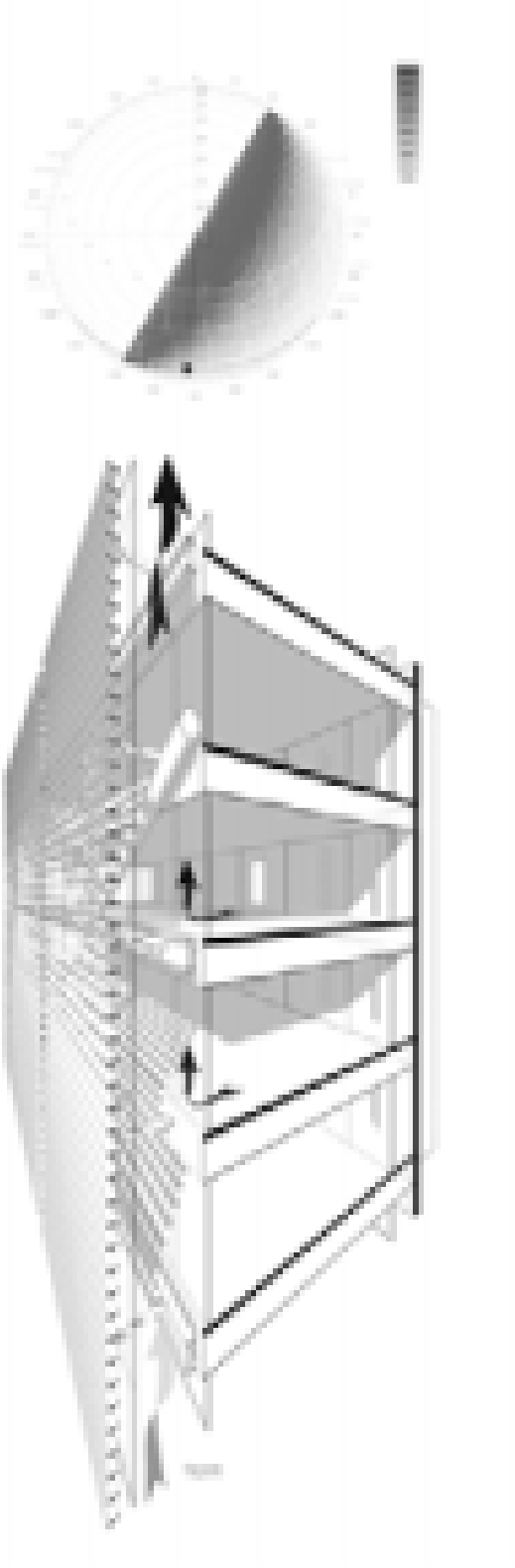




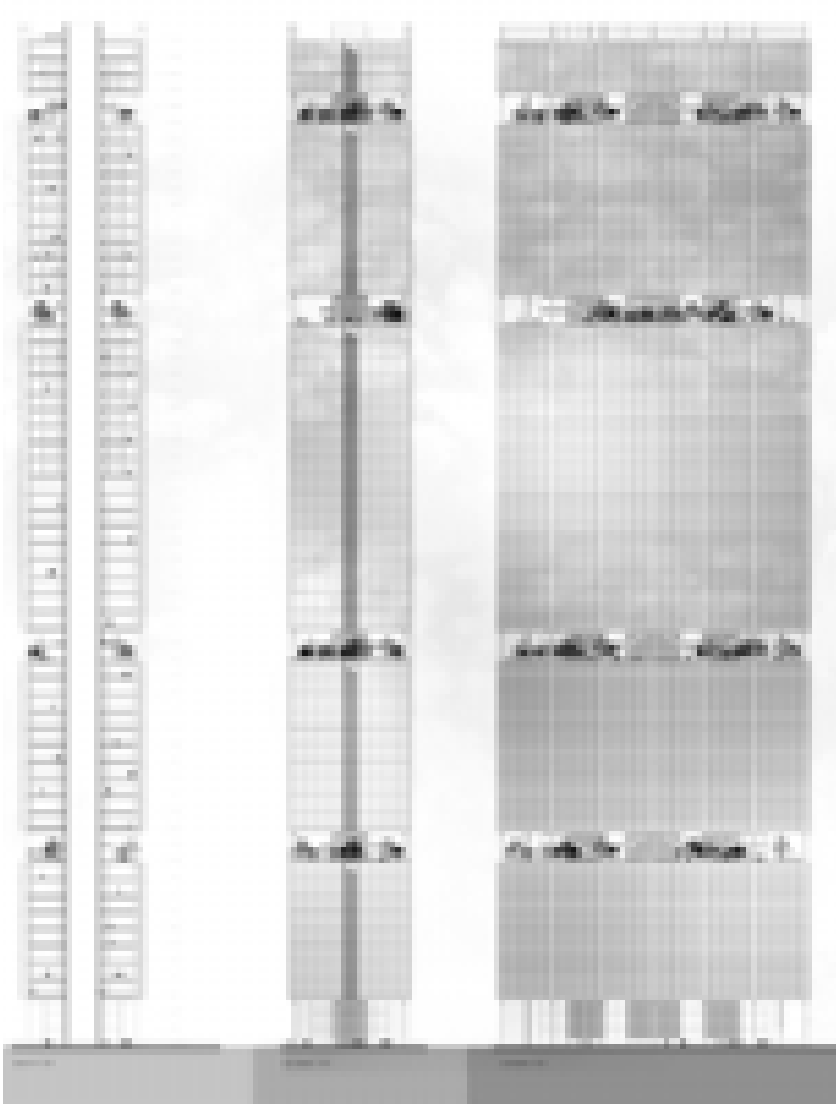


↑ urban concept
← plans
→ view of the model



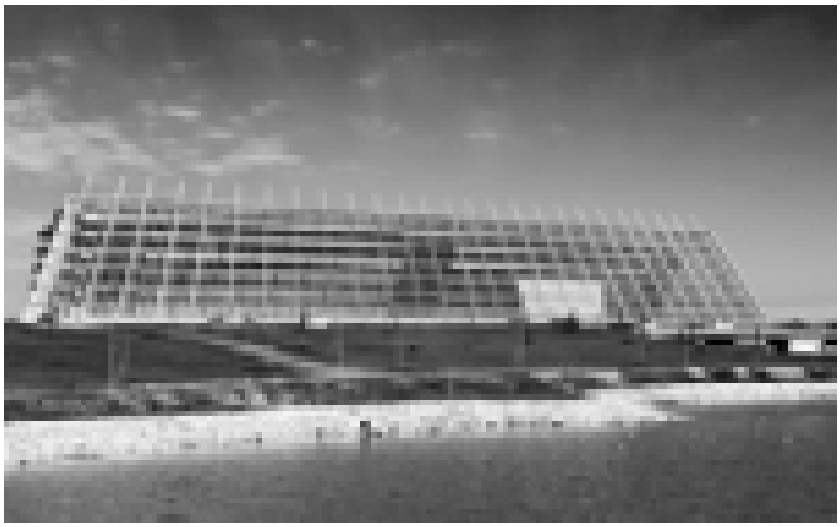


← facade detail
↓ elevations and section



WITH THE S UPPORT OF :

Studio Altieri + Permasteelisa Goup + Agc Glass + Schindler group



STUDIO ALTIERI

Altieri's family has played an important role in engineering in Italy since 1898, when the engineer Vittorio Altieri founded Studio Altieri. Passing through three generations, Studio Altieri grew up to improve the structure of its original purpose: create buildings with a view to improving the quality of life in tight control of costs in different areas. Today Studio Altieri is structured as a shareholder in two companies: Studio Altieri S.p.A. (90%) and SVEI S.p.A. (100%).
With 219 employees, a total production equivalent to 32,2 MIL Euro in 2010, Studio Altieri is able to respond to all requests from the conceptual stage through the work supervision on site. One hundred years of history gave to Studio Altieri a leading position in the hydraulics, health, civil construction, transport, marine works and environmental engineering fields. The main objective is the satisfaction of its Contractors by interpreting customer needs, analyzing the market and examining the constraints imposed by laws and regulations regarding the design matter. The design is developed in

accordance with the international standard UNI EN ISO 9001:2000 directions.
In the architecture and civil engineering field, the Studio Altieri's innovation went in two directions: in health for rebalancing the hospital, seen as an high-tech machine for the care of the patients, with the quality of the interior and outdoor spaces, of the green space and lighting - typical example is the New Hospital in Mestre (opened in 2008).
In the large civil constructions scope, the research devoted to the most efficient industrialization and prefabrication technologies: example of European importance is the new Exhibition Center in Milan (2003) a site where over 1.500 workers did in 30 months 540.000 sq.m. of steel and glass buildings, and where original coverage systems created fascinating, innovative lightning and shapes. Thanks to continuous research and experimentation activity, Studio Altieri is able to develop the complete systems project - thermo-mechanical, electricity and hydro-sanitary - with an attention to the energy saving aspects.
Transport engineering: in recent years Studio Altieri S.p.A. has been specialising in Engineering Services for Transport Infrastructure Works, concentrating in particular on Project Financing. The most important projects include: Project Financing for the Road System in Veneto, Project Design and Execution plan for Mestre-Venice guided rubber-tyre tramway system, Project Financing for transport system underneath the Venice Lagoon.
The three technical operation areas hydraulic engineering, water treatment and environmental engineering- are responsible for the development and mastering (through training, participation in associations and market research) of expertise on specific subjects: reclamation interventions, river renovation works, urban wastewater and storm disposal systems, irrigation and depuration plants and aqueduct networks, are some of the types of projects performed, together with the design for maritime constructions (docks, confinement works, breakwaters, maintenance and functional recovery of lagoon areas).
In the hydraulic constructions field, Studio Altieri signed the first project in Italy that involved digging of aqueduct tunnels

with self-propelled cutter (Rovereto, 1982), the laying of sewerage pipelines in large urban context without excavation (600 meters in diameter 1400 mm in Mestre , 1995), the threading of long underground pipelines adduction with the technique of remote controlled drilling (940 meters in diameter 200 mm under the Mouth of Malamocco Venice, 1999).
In environmental engineering field, Studio Altieri has given the contribution to some recent projects for waste water treatment aimed not only for the cleaning, but also for the recovery for non-potable used water, thus anticipating technical solutions that will probably be required in the near future.
This was the Fusina Integrated Project, which allocated all urban waste water to the reuse industry, with the technology and natural processing, the bio-treatment Centre in Camposampiero, which converting organic waste, livestock manure and sewerage water into energy, water for irrigation and compost for agriculture; the biological membrane systems of Cittadella and Lessinia.
For over a decade, Studio Altieri has been involved in morphological and environmental recovery activities.
The technicians work specially in the sensitive habitat of the

Venice Lagoon, as designers for the Consorzio Venezia Nuova, sole concessionaire for the Water Authority of Venice (Ministry of Infraestructure) for new interventions for the Safeguarding of Venice. The remarkable advisory expertise for the safeguarding and rehabilitation of contaminated sites of Studio Altieri has extended even to other sites of national interest (SIN) appointed by "Sviluppo Italia Aree Produttive".

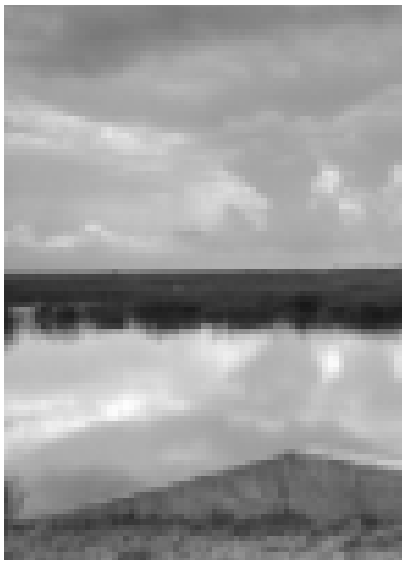
Sustainability projects in the area of Porto Marghera (Venice)

At the beginning of the century Venice port was already the second port of Italy in terms of importance (after Genoa), but still, more and more land areas were needed to expand and support it's activities (petrol and carbon transport, railway system improvement). These areas were located in the southern area of Mestre soon named after the name of Marghera (translated, "here was the sea"), in fact the area was partially a salt marsh that had to be reclaimed using the dredged sediments from the excavation of the channels. This first industrial area had a really fast growth and in 1925 more than 100 companies were located there and 1'500 persons were employed in the area. In 1950 a new plan to expand the industrial site in the Northen part has been approved. In this new area, called "the 2nd industrial area" petrochemical factories were located and quickly expanded. The new Petrochemical area developed really fast, in the 60's more than 200 factories from various fields (chemistry, metallurgy, constructions, steel and ceramic industry) based their production processes there. The "Petrolchimico" had a continuous growth until the 70's when the number of activities and employers started to decrease and main activities remained petrol refinery and production of chemical compounds.

The complex scenario of many activities in such different fields and the fast growth have inevitably left a mark derived by chemical compounds used during the production processes in soils and water of the area. Therefore, the necessity of environmental hydraulic and geotechnical engineering interventions has quickly shown up. During the few last decades the issue of Porto Marghera contamination has reached a relevant importance in social and political life of the Venice area. Priority is given to soil reclamation and environmental contingency, in order to transform the area, from industrial to a place that could accommodate different land uses, from recreational to housing development. Main activities are:

-Strategic confinement in order to avoid contamination transfer from Porto Marghera to the whole Venice Lagoon. More than 70 Km of steel pile sheets and concrete walls are used to confine the contaminated areas;

-Dredging, embanking and requalification of the industrial channels. ;



-Contaminated soils reclamation using the most advanced techniques
-Contaminated water treatment by the construction of new treatment plants
-Soil and ground water monitoring and characterization.
Nowadays lots of activities of environmental requalification and industry conversion take place. These projects include:
-The Fusina Integrated Project (PIF) which enhances and upgrades the Fusina wastewater treatment plant, located directly west across the lagoon from Venice itself. This project includes a 100 ha free-water surface treatment wetland, constructed at the so called "Cassa di Colmata A", a reclaimed area facing the Venice Lagoon. This project represents a marquee example of a sustainable solution to water quality issues and land-use management in a world-renowned location. Numerous islands constructed within the wetland's open water zones provide to birds a refuge from predators. During migratory season and winter months, the wetland represents a proper environment for rest for bald-coots, wild ducks, garganey, shoveller and teals. Reed thickets provides ideal nest-building for several species of birds, for the uncommon duck-hawk and various sparrows. Small

mammals, grass snakes and marsh turtles, a variety of frogs and fish have already adapted to the habitat within the wetlands complex. A visitors' center and passive recreation facilities will be soon incorporated to ensure the community benefits from this restoration project.

-The "Moranzani" Agreement, that provides a solution to the management of contaminated dredged sediments from industrial channels; the agreement also envisages recovering the use of areas that are seriously compromised by physical deterioration, flood risk and sanitation, road and landscape issues, thereby improving the urban environment, infrastructure, and usability of the zone and public green spaces.

-The development projects planned by the Port of Venice, that include a new Ro-Ro terminal implemented in Fusina at the junction between the southern industrial channel and the Malamocco-Marghera channel as an answer to the increase in Ro-Ro and Ro-Pax traffic driven by the Motorways of the Sea (MoS) initiative, and the new container terminal with a distripark, which will be erected in the site of former industrial facilities in Porto Marghera.

-The VEGA Park of Science and Technology - a network of

universities, research centres and manufacturing business thought to promote and develop scientific research initiatives. Located in the northern part of the industrial zone, it is an important example of the redevelopment of Porto Marghera. These and other activities play a key role in the transformation process taking place within the 3000 hectares of the Porto Marghera industrial area in order to guarantee a sustainable development and environmental protection of the Venice port and its lagoon.

www.studioaltieri.it

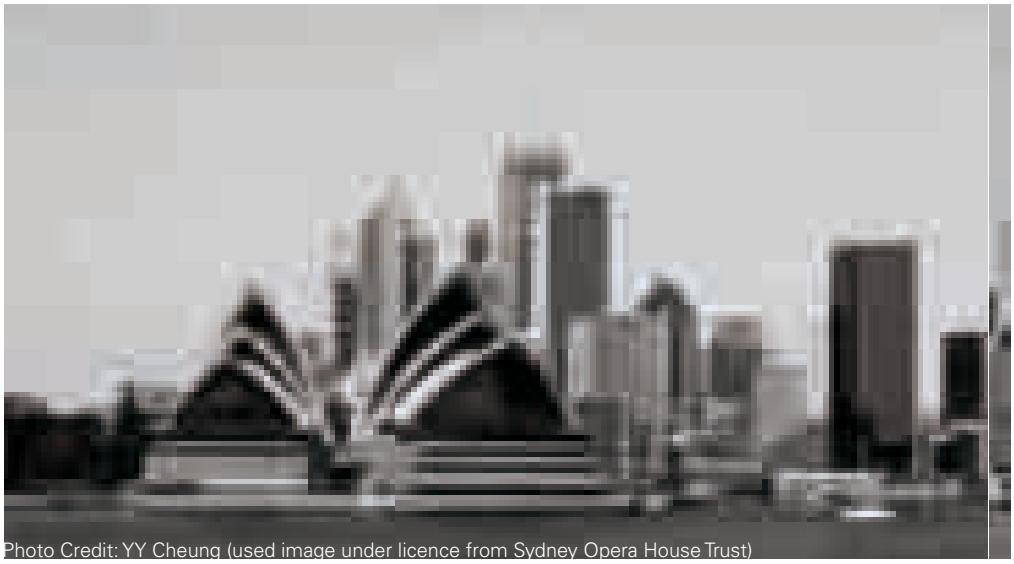


Photo Credit: YY Cheung (used image under licence from Sydney Opera House Trust)

THE PERMASTEELISA GROUP

Permasteelisa Group is a worldwide leading Contractor in the engineering, project management, manufacturing and installation of architectural envelopes and interior systems. The Group brings its Know-How and expertise to all projects, in particular when dealing with Special Features Buildings, beginning with the design development phases all the way to the successful completion, achieving the customer's expectations.Originally incorporated in 1973 in Vittorio Veneto, Italy, with the name of ISA, during '80s and '90s the Group started an international expansion in the Australian, European, Asian and US markets. Today, Permasteelisa is a global integrated Group present in four continents with a network of almost 50 companies in 27 countries yearly generating a total turnover of around 1 billion euro.The Group employs over 5,500 people worldwide in its Engineering & Design centres and in the 12 manufacturing plants equipped with the most modern and advanced technologies. The mission of the Permasteelisa Group is to design and build innovative and avant-garde architectural works alongside the

Photo Credit: ©Lester Ali Photography

world's greatest in contemporary architecture, by using advanced technologies and eco-sustainable solutions. The quality of our architectural envelopes and interiors is guaranteed by our rigorous quality control system. Besides, it's constantly improved throughR&D in new design and construction technologies and throughthe use of innovative materials. The use of environmentallyfriendly materials and eco-sustainable processes, and our commitment in energy saving, protect the environment and make the buildings themselves more comfortable and efficient. Among Permasteelisa's projects are some world-renowned contemporary architectural works, such as the Sydney Opera House (the first building to make extensive use of the curtain walls), the revolutionary Guggenheim Museum in Bilbao, the extraordinary Walt Disney Concert Hall in Los Angeles and the Museum of Modern Art in New York.

www.permasteelisagroup.com

AGC PLANIBEL LIGHT

choose the emissivity of the glass

Italy for its conformation has very different climatic conditions that are quite unlike each other, from the cold North regions to the warm South ones.These differences are not limited to temperatures but to an environmental context in all its complexity. Surely the values of the D.leg 311 were a call to the awareness of energy saving, but now is no longer sufficient to consider only the thermal insulation values but solar control too for a better comfort. Today extremely different places are glazed the same Low-emissivity glass types (Insulating Glass with an Ug value of 1.1 or 1.0 (W/(sq. mt.K) with 15 mm Argon 90%)).

This is no more the right approach. For an aware choise of a suitable glass to glaze in a residential application, it is very important also the Solar Factor (SF or g) is also a key parameter. SF allows to know the real capacity of a glass to control sun's radiation.In the North Italy the fundamental role of the glass is to limit heat dissipation during the winter months and to maximize sun's light and energy contributions

utilizing natural light.On the other hand, in a diametrically opposed situation in the South Italy and particularly if the realization is South oriented, the glass has to offer different characteristics:
in the winter period glass has to limit heat dissipation while. in the summer period it has to reduce the free energy contributions of the Sun and consequently save the high cooling costs .In order to offer always the best solutions according to the different architectural and climatic requirements, AGC has launched a new Low-emissivity glass : Planibel Light. This new product completes AGC Low-emissivity range.Planibel Light is the ideal product for all residential applications, when a high thermal insulation is required (Ug 1.0 (W/(sq.mt.K)) in the winter period and a significant reduction of the Sun energy contributions in the summer period can be used to reduce cooling costs .

www.agc-glass.eu

VERTICAL ACCESSIBILITY

Alessandro Roversi - Schindler

Designing lifts for the High Rise segment.

Our cities have seen the construction of increasingly taller buildings during recent decades inhabited by an increasing number of persons.

Lifts have contributed significantly to the increased "heights" of residential buildings: the passengers travel hundreds of metres in a few tenths of seconds reaching their required floor in the shortest time possible, quite safely and in the greatest comfort.

Today, the lift has become a crucial feature to access the inside of a building, contrasting with the situation applicable in the past, when the lift was only considered to be an "accessory", a far cry from satisfying the real transport needs of its passengers.

The need to travel increasingly greater vertical distances and to transport an increasing number of passengers have made the companies operating in the sector invest in the research and development of technologies with the aim of increasing the performance of high rise lifts.

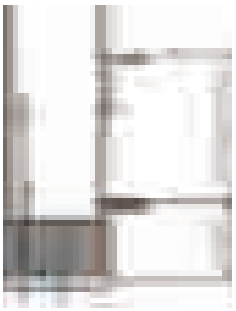
Innovation has impacted all the main components of the lift system: for example, motors with gearless technology and with the widespread use of inverters are able to move the lift cabins at a speed that exceeds 10 m/s, with considerably reduced consumptions compared to the old drives equipped with a gear or operated using direct current, assuring greater respect for the environment and sustainability.
The control operations have also undergone a major technological change: sophisticated processors optimise the lifts' control and operating logics achieving significant benefits when handling passenger traffic and the transport needs of individual persons. To complete the way lifts have developed it is then also important to consider the use of alternative, lighter, eco-compatible materials, which in general, are completely recyclable. Today, the market has available innovative products which can assure efficient transport systems when they are appropriately combined. The "tailored passenger" design is the

1

first step to equip buildings with lifts which are able to react to any transport condition.**[1]**
Traffic analysis is an excellent simulation tool used to verify the efficiency of the planned lifts configuration after a number of important parameters have been considered, such as the following:
–The building's structural features, for example, the location, the intended use (offices, hotel, residential, etc.), the height, the number of stops, the inter-floor distances, the dimensions of the lift shafts, the lift pits and the overheads **[2a / 2b]**
–The type of traffic flows to be served, in other words, the population distribution per floor, service time bands, type

Dimensionamenti vani
Testata

Velocità	Testata
1,6 m/s	3600 mm
2,0 m/s	3950 mm
2,5 m/s	4600 mm
3,0 m/s	4600 mm
3,5 m/s	4600 mm
4,0 m/s	4900 mm
5,0 m/s	4900 mm
6,0 m/s	5900 mm



Dimensionamenti vani
Testata

Velocità	Testata
1,6 m/s	1500 mm
2,0 m/s	1800 mm
2,5 m/s	2100 mm
3,0 m/s	2800 mm
3,5 m/s	2900 mm
4,0 m/s	3600 mm
5,0 m/s	3600 mm
6,0 m/s	3700 mm

[2a / 2b]

of traffic, special accessibility needs, disabled passengers, particular population concentrations at the floors.
–The lifts' technical configuration, namely, the number of lift cabins and the respective load capacity, the floors served by each lift, the type of drive and the doors.
Some simple considerations help to identify an initial configuration solution for the transport system. For example:
–The maximum time to travel from the lowest floor to the highest floor must be close to 20 seconds [travel (m) / speed (m/s) = approximately 20 seconds];
–Foresee one lift cabin every 200/250 persons in the case of a group of lifts;
–Foresee a group of lifts every 20 stops in the case of buildings with more than 20 stops.
The perfect balance among the various components establishes the best performance of the lifts to the advantage of the passenger distribution on the floors: the least number of intermediate stops between the departure floor and the arrival floor; reduced time to reach the destination and the waiting time at the floor; lower electric power consumption produced when starting the motors.
Different passenger transport requirements correspond to every

[3]

Office Building	HC5	INT	WT
Single tenant (low requirements)	12–15 %	25–30 s	20–30 s
Single tenant (high requirements)	13–17 %	20–25 s	16–25 s
Multi-tenant (low requirements)	11–14 %	25–30 s	20–30 s
Multi-tenant (high requirements)	12–15 %	20–25 s	16–25 s

intended use of the buildings.Limited traffic flows will need to be managed in the case of residential buildings which are usually not very tall; service and comfort must be privileged in hotels; high traffic peaks which are concentrated in the time bands when the employees enter and leave the building need to be managed in the case of offices, in addition to intense movements of persons between floors. It is precisely the lifts installed in buildings for office use which require the greatest operating flexibility. Precisely these systems are typically high rise.
International design guidelines, like the Chartered Institution of Building Services Engineers (CIBSE) recommend lift systems which are able to transport between 12% and 15% of the resident population (HC5) in the reference time of 5 minutes in the up peak traffic distribution condition (Up-peak traffic), for example, when the building is occupied by employees in the morning, and to limit to within 30 seconds the maximum waiting time (Waiting Time - WT) that the passenger must wait for the lift to arrive from the moment the passenger calls the lift. **[3]**
Once again the importance of avoiding queues at the entrance and slowing down internal movements between floors is highlighted, especially in buildings which are occupied by several companies. The electronics applied to the control systems have been designed to render "traffic management" in line with the requirement.
For a number of years now control systems, in particular, the control systems for lifts installed in offices, operate based on the principle of "controlling the passenger's destination". Compared to the conventional control systems which are referred to as "collective selective", the "destination control" solution foresees that the passenger selects the destination floor before entering the lift cabin; the control system takes advantage of the information communicated before the passenger enters the lift and allocates the lift cabin that is nearest or allocates the lift cabin that will reach the requested floor first, avoiding or reducing the number of intermediate stops in relation to the final destination.
In this way these systems are able to distribute large traffic flows, by optimising the flows: the passengers are channelled towards lift cabins which assure delivery of the largest number of

persons to the same floor, significantly reducing the destination time (Destination Time - DT) to reach the requested floor.
High travel speeds can be exploited in this context with lift cabins which do not stop continuously at all the floors.
For example, in Europe, the speeds of lifts installed in buildings used as offices correspond to between 2 and 6 metres per second, while in the Far East the speeds can even reach more than 10 m/s. A large number of passengers living in a building and that move inside the building require careful and prior supervision for logistic and safety purposes: once again lifts are very helpful in managing all these aspects.
The control systems can be programmed to subdivide the building into various zones, also subject to access restrictions, in addition to foreseeing predefined configurations based on passenger profiles, also made possible by means of identification badges which "authorise" the lift's use. For example, this means that only authorised personnel can reach some predefined floors or perhaps the general public can only access a number of dedicated floors; and each company will have its own customised access in the case of several companies inside a given building.
Identifying the passenger is crucial in order to satisfy the specific movement needs: a disabled person that uses a wheelchair will be assigned a lift cabin that will take into account larger available internal spaces; VIP guests will be able to travel

separately from resident staff, service staff will travel in a reserved lift. Therefore, accessibility for all, without restraints.

The Schindler Group

The Schindler Group was established in 1874 and today Schindler is a leading multinational group for urban mobility and is present in more than 140 countries worldwide.
The Company's business includes the engineering design, installation, maintenance and modernisation of lifts, moving staircases and moving walkways for every type of building. The Group employs approximately 43,000 persons worldwide and achieved a turnover in 2010 amounting to CHF 8.18 billion (Euros 5.9 billion). The Company employs a staff of approximately 1,100 persons in Italy and has a widespread network throughout the country with 13 branches and 16 territorial offices. Schindler favours sustainable urban growth by supplying mobility solutions which are safe, reliable and ecological.

www.schindler.it